PC PILOT

The World's Favourite Flight Simulation Magazine

SURROUND YOURSELF WITH SOUND
in our fantastic speaker competition

BATTLE OF BRITAIN SPECIAL
Full preview and an exclusive demo

ONLINE COMBAT
The height of hype - Fighter Ace II and Aces High through your modem

HERE'S ONE WE BUILT EARLIER!
Cockpit building from the simple to the simply stunning

MAD FOR THE MAD DOG
Take a look from the Captain's seat

PLUS ALL THIS INSIDE:

Eurofighter Typhoon • Airbus 2000 SE • 777-200 Pro • Flight Planning Feature
Combat Tutorial • FS Commander • Flightdeck Videos • CH Yoke • and more...

07

5 035063 001508

Contents

Features

6 Free Cover CD
An exclusive Battle of Britain demo, shareware, patches… You'll find it all on this super giveaway.

28 Closer to Reality
PC Pilot takes an in-depth look at the art of cockpit building. Find out how to get totally immersed.

33 Multi monitors for flight simulation
Once you've built your cockpit you'll need to see out of those side windows. Here's how!

34 Flight Planning
When you're flying a real aircraft you can't just jump in and go (shame). Find out how to plan your flights for even more realism.

40 Building your own aircraft
Look out Boeing! The intrepid Joe Lavery has tried his hand at an aircraft using FS Design Studio. Find out how he got on and test fly the results on our CD.
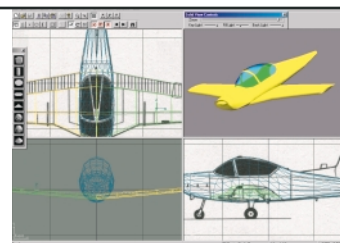
44 Tumult in the clouds
How to stay aloft in combat simulations with the bandits on your tail. We've put together a useful and informative combat tutorial.

58 Everything's under control
The new USB yoke from CH Products as well as the ACP controller and GF45 display. Do these gizmos really put you in control?

43 → Competition
We've got two sets of state of the art speakers to give away courtesy of Altec Lansing

SUBMISSIONS

We will gladly accept and review for publication any letters, articles, photographs or other contributions. We cannot guarantee publication nor, regrettably, return items sent to us or be responsible for their safe return. We will try and reply where possible. Any letters are assumed suitable for publication unless we are otherwise notified.

With many thanks to Alex and Doug, founders of the original PC Pilot four years ago, who kindly gave permission for us to publish under the same name.

Editor's Letter

"The sim now arriving on Platform 1…"

Welcome to our seventh issue, that goes to press 60 years after the Battle of Britain ended. PC Pilot is a year older, wiser and firmly on the road to our own 60th anniversary in 2059. Hopefully by then, the eagerly awaited Light Aircraft Simulator 6.0 from Digital Aviation will be available and some of our readers, who have been parting with their money since 1996 for this elusive product, will either have something to fly from their bath chairs or their money back!

Although Microsoft are soon to produce a train simulator, that's no excuse for flight simulation to copy railways with monumental delays. Frankly, we were appalled to read some of the mail generated by the news item about LAS 6.0 in Issue 5. The release advised it was 'out now', but it's no more 'out now' than the Prisoner of Zenda! It appears that Messrs. R. and G. Pallet (the developers) have been promising a new version of their popular LAS 5.0 since 1996. Nothing wrong with that, as any software user knows - promised release and actual release are often widely apart. However, this saga is a holy grail for any consumer programme because Digital Aviation have been happily taking money from their clientele for four years on the promise of a product that has still to be released.

We found that there's a whole army of angry customers out there, who've had their credit cards debited but received nothing apart from a few vague e-mails advising imminent release since 1997. However, you shouldn't underestimate Digital Aviation – they're quite clever. We've heard reports of people (including Trading Standards officers) being shown 'beta' versions of the software and their most frequent excuse is that they are still trying to cope with the change from Windows 3.1 to Windows 95.

In the true spirit of consumer journalism we tried to contact Digital Aviation but their e-mail account has been closed and they refused to talk to a number of our readers who attempted to speak to them. Mind you, their web site is still up and running and will even take money for their older products (check out that screen shot). Private buyers aren't the only ones with problems - we spoke to Bob Sidwick of RC Simulations, who is another 'victim' of failed promises from Digital Aviation. Bob regularly gets contacted by irate Digital Aviation customers, after he advised that he would be stocking LAS 6.0 when it came out. Bob has asked us to stress that he has never taken any money from his customers for this product and certainly doesn't intend to until he's got a box in his hands.

So, come on Digital Aviation, we aren't bothered about press releases or hearing your excuses but many of our readers are bothered about the loss of their money. We'll pass our files on to the appropriate authority and would recommend any readers who have spent money and are waiting for LAS 6.0 to get in touch with their local Trading Standards at once. Thanks to all of you who wrote in – we're only sorry we can't get more of an answer. Please don't let our editorial keep you awake at night, rip-offs are rare in flight simulation, but every barrel has a rotten cliché!

Keep 'em peeled

Dermot Stapleton
derm@pcpilot.net
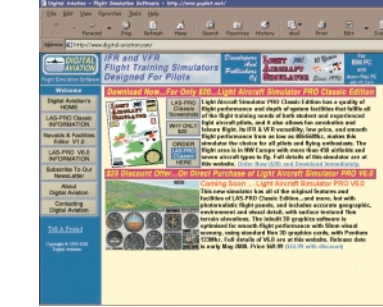
LAS 6.0 - stuck in the sidings

COMMS

Squadron notices

FROM: Ade Pitman

Being a subscriber to your excellent magazine, and having previously suggested that you feature virtual squadrons along with your virtual airline feature, I am writing to bring your attention to a situation that currently exists on the Electronic Arts/Janes Combat site, www.janes.ea.com.

As you are aware, this is the site from where all of the Janes flight sims, fly online and it affects : F15, Israeli Airforce, Fighters Anthology, Longbow 2, WW2 Fighters, Fleet Command, USAF and F/A 18.

I flew two of these titles online, and both USAF and F/A 18 were recently featured in your magazine.

For the past two months the site has been closed, with the reason given as a 'security breach'. Many of us have contacted EA and been given a 'fob off' and no estimated time for the site to resume. Having read the Editors letter in

issue six, I suspect that the closure of this site is more to do with EA's decision to 'stop further flight sim projects'. On behalf of all the people that use this site, I wondered if it were possible for your magazine staff to investigate this situation, and possibly publish the reply from EA? In the meantime, a league has been set up at (www.myleague.com/ww2fight/), where virtual pilots can meet and arrange to fly WW2 Fighters using an IP number. This method is, however, very difficult to arrange due to the problems in co-ordinating the times of all the pilots. On a more cheerful note, my squadron can be found at (http://jg27.homestead.com/jg27.html). This site details our members and policies, together with links to other virtual squadrons that (used to) fly on JCN.

We reply:

We'll be in touch with EA, but at the time of going to press, nothing to report. Watch this space, although we rather suspect that no news is bad news!

Fully X-Planed

FROM: Alan D. Kerr (a thinking simmer)

Hi there, I just got the latest copy of PC Pilot and was delighted to see it features X-Plane. Recently, after suffering one jerk too far, I decided to sell my copy of Flight Simulator 2000 and forked out the cash for X-Plane - on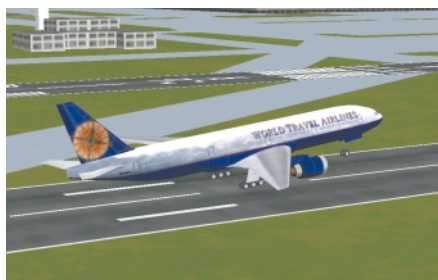e of the best decisions of my PC career. On balance, it's simply superb when compared to the Microsoft effort. The angle of attack of the two companies could not be more opposite. X-Plane goes for fluidity, accurate flight models and excellent weather simulation. The nightlighting, the clouds, the haze, the whole ambience is terrific. Microsoft seem to prefer the pedalling of hype. "As real as it gets"? How many real planes have you encountered that jerk and stagger around the sky? Not to mention the dreaded "eye candy". When you boil it down (for my money) X-Plane is a flight simulator, because it simulates flight, instead of providing hype as a substitute for real substance.

FROM: Barry Myers

Firstly, congratulations on a very fine magazine. I look forward to receiving it and whenever the issue date gets close I am watching the post intently for its arrival.

A comment on your review of X-Plane, covering one or two things not mentioned. I believe the developer first wrote it for his Apple Mac, and the program is produced for both Mac and PC.

On the Mac version speech is incorporated, using the Macintosh Speech extension. After filing a flight plan and informing ATC you are given verbal permission to taxi and then later take off. During the flight the controller is heard speaking to other aircraft and also to yourself, using your callsign and you are passed on to other centres as in real life. ATC tells you when to reduce height when you are getting close to your destination, and you can either choose a precision approach or ask for vectors for the ILS. Charts are also incorporated in the program. You pull up the appropriate chart which gives you the ILS frequency, you lock on to the localiser and land. Very realistic!

I have used the program now for about two years and think it is great. I also run Fly!2K and Flight Simulator (on my wife's PC). I fly for Hawaiian International Airlines, a virtual airline which is specifically for pilots using X-Plane or PS1.

We reply:

Thanks to all of you who wrote in response to our X-Plane review. We found it a very interesting flight simulator and hope to see it even more in the mainstream. We'd also like to point out that our quoted price of £50 was based on a conversion from the price on the X-Plane web site and doesn't include the costs of postage. Bear this in mind if you see it quoted at more than £50 in the UK - it may still be cheaper, as the transatlantic postage is pretty steep.

The Voodoo magic

FROM: Frank Grindel

I read Greg Gott's review of the Voodoo 5 5500 in Issue 6 and wanted to ask if he knows if the FSAA (full screen anti-aliasing) feature is now enabled for Flight Simulator 2000? I was considering purchasing the card but felt that the frame rates were not particularly impressive and if the FSAA feature were enabled, that the frame rates would suffer by a significant margin.

Also, it would have been valuable to run a side by side comparison of the Voodoo 3 3000 or Voodoo 3 3500 versus the Voodoo 5 5500 with identical CPUs to see if the frame rate increase was worth the money or if the FSAA frame rate penalty was too heavy. I realize the Voodoo 3 3500 was already reviewed but it was with a different speed CPU which makes it difficult to equate the results with the Voodoo 5 5500 review.

We reply:

The anti-aliasing is now sorted for Flight Simulator 2000. To quote our hardware expert, Greg Gott: "Flight Simulator 2000 is like a new sim! No more coastline artefacts, the runway paint is solid and the entire display gets a much-needed face-lift. To get it working, in your Flight Simulator 2000 configuration file, add this line under [Display] PageFlip=1. Then enable two-sample or four-sample FSAA and enjoy. YES, performance does take a hit! Initially I am seeing a 20% loss in frame rates, BUT the enhanced graphics make it worth it (at least for today). It also works in Flight Simulator 98 under [Hardware], but we haven't tested that one, yet". We agree with your comments about reviewing the Voodoo card with it's predecessors and we may try this in a future review of graphics cards.

Have screens, will fly!

FROM: Chris Steavenson

The other day I saw a triple collimated 3D display in high res. I was stunned by its performance and taken aback at how queasy it can make you feel. I am going to order this display plus an array of 1Ghz Pentiums and would like to place a letter in PC Pilot asking for a volunteer, expert on Flight Simulator 2000 and local to Sevenoaks/Tunbridge Wells who would like to help me build this system and use it when complete. I am myself skilled at computers, but there are many issues to address. The display takes five months for delivery, giving me an ideal opportunity to build the system with three standard monitors.

These will be needed as back seat control whilst other users are on the system. I thought that there might also be an opportunity to create a south-east FS forum where a number of people in the region who are like minded could meet up regularly on a sort of club basis.

We reply:

Happy to pass on the request, Chris. Interested experts can mail Chris at: polymail@compuserve.com. Also, if you want to set up your own forum, look no further than The Mag. Our own Mike Clark offers webmasters the chance of hosting your very own forum at The Mag, so no need to worry about the complex setting up of CGI scripts on your web server. If you would like your own secure private, public, or moderated forum then please let them know – they'd love to help out. Simply write to forums@themag-fs-news.com and they can set one up in double quick time!

First, second, third…..?

FROM: Andreas H.G. Herbst

In the preview of Jumbo Jet 2000 v3 in Issue 5 of PC Pilot the author mentioned my name as the producer of the first version. This is not correct. I was the producer of '747, FLY THE BIG ONE' and of 'JUMBO 2.0'. We didn't produce Version 3 and there was no Jumbo Version 1.0. Version 3 was developed by Technik Direct, Austria, which was not mentioned and readers will think I was the developer of Version 3. I would like you to correct this article with an official announcement in the next issue.

We reply:

Glad to oblige with a statement, Andreas, although the whole matter is rather confusing, not helped by the same product appearing to go under different names in different countries. The 'first version' we referred to was simply called '747' in the UK, as per the box and is the copy we have in our office. This was the only version in the UK prior to the one we previewed and it credits you as developer. The 'next' version, as far as we can ascertain, is 747 Jumbo Jet 2000 v3 (Data Becker were very specific about the title we used) and we advised in our preview that this was developed by Data Becker. We're sorry for any confusion caused, but we do stand by all the information in our preview.
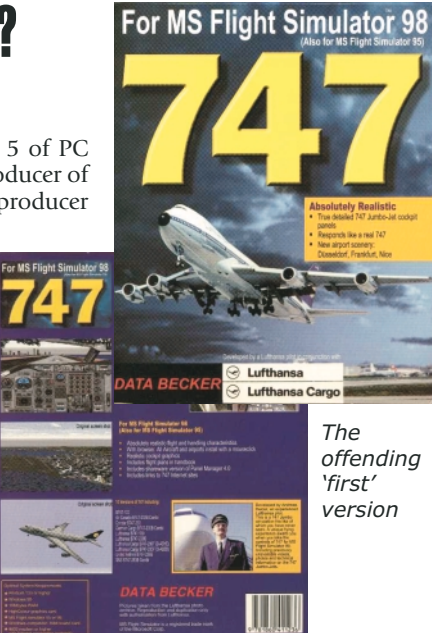
The offending 'first' version

THE FREE CD-ROM

Not content with an exclusive preview of Empire's forthcoming Battle of Britain, we've managed to get PC Pilot readers their very own demo version of the latest dogfight to reach for the skies! As if that isn't enough, we've also got the superb P-51 from Roger Dial to complement the Corsair we featured in Issue 6, the latest X-Plane updates and a superb collection of products to try from simmarket.com and some handy patches for anyone without a free phone line.
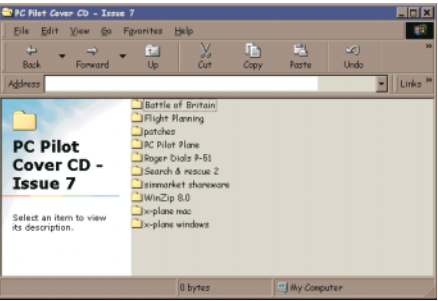
The CD does not autorun. For your convenience we've assembled the CD in a set of easy to access folders. Open up the CD by gong to 'My Computer' and double clicking on your CD drive icon. When it opens you'll see that each section is loaded into its own clearly marked folder. Double click on the folders to open them up and see the rest of this feature for detailed descriptions of everything inside. **You must read the relevant readme files, where included, before installing. This is especially important in the Battle of Britain and Search and Rescue demos.**

BATTLE OF BRITAIN DEMO

Before it's even hit the shops (well, just) PC Pilot have got a superb demo of the one they're all talking about. It's the 60th anniversary of the Battle of Britain and you can be the first of few to get up in the skies with Empire's promising new combat sim. We've previewed this long-awaited offering in this issue and now you can see for yourself how the successor to Mig Alley and Flying Corps fares on your PC. Remember that this is only a demo and just as our operative was obtaining the last files he heard a door

creak in the Empire offices and had to bolt. He escaped with the demo, but left the instructions behind! Please note that to successfully (?) exit a mission, you must press Alt + X (or Ctrl + E and bail out). Once the pilot reaches the ground you are automatically returned to the main menu and you can quit as normal. **Important: you will need to have DirectX 7.0 or later installed on your PC. Please also ensure you run the demo at a minimum resolution of 1024 x 800.**

ROGER DIAL'S P-51D

Glamorous Glen III, was flown by Captain Charles 'Chuck' Yeager, breaker of the sound barrier and is another excellent model from Roger Dial. The aircraft sports lots of moving parts and night-time textures for the virtual cockpit. It has a sliding canopy that activates when the gear retracts, and the pilot's head turns left and right with joystick movement. This is a fully functional demo model that is due to be released as a commercial product. Designed by Roger 'Airbuddha' Dial, the sound is by Mike Hambly and the flight model is from Bruce Thorson. You can find out more about it from http://thehangar.dogfighter.com

X-PLANE 5.36

We've got the latest mighty download for X-Plane – version 5.36 weighs in at a whopping 60Mb and we've also included the Mac version for all those graphics boys who want a flight sim to use on their electronic pencil boxes. If you've never tried X-Plane this update also works as a full demo, but it is only a demo, so please don't ask for product support – the stick is meant to freeze after five minutes!

FREE TEST FLIGHTS!

Those rather wonderful people at simmarket.com have put together a great selection of shareware for PC Pilots to test fly. There's 15 excellent products to try out, including FlightSim Commander, as reviewed on page 18 of this very issue. If your appetite's whetted by any of these you can get full versions from www.simmarket.com.

SEARCH & RESCUE 2

We've been intrigued by the rather good screen shots of this helecopter sim – see page 8. Hopefully we'll review it in a future issue, but in the meantime we've unearthed this playable demo so you can give it a spin yourself in 3 different missions. Please have a good look at the readme file before loading this one, as it has important information on how to fly the helicopter.

PC PILOT HOME-BUILT PLANE

We thought you might enjoy a look at the modest little CT-4 that we designed for the aircraft building feature on page 40. Please feel free to have a spin in it, but remember, this was to demonstrate what's possible in a short time, not to show off our skills. Having said that, Joe will start talking to any commercial publishers who are interested for a five figure sum!

WINZIP 8.0

The latest version of the world's most useful utility. You'll need this installed before you can open any of the zip files on the CD. Please note that this is shareware and you should register and pay if you want to use it on a regular basis.

PATCHES

To help with your phone bills we've got the most recent updates for Gunship!, Janes F/A 18 and MiG Alley. We've also included the latest updated drivers for the Voodoo 5 5500, in Windows 95, 98 and 2000. These are only beta drivers and are not supported by 3dfx or PC Pilot. Remember, developers always warn that beta drivers could crash your machine, so read the notes first! ■

IMPORTANT - TECHNICAL SUPPORT

The CD and software on it, with the exception of shareware files, is free and as such, PC Pilot, Just Flight nor any of the publishers or developers of the software supplied on the CD can provide technical support. The software is supplied very much 'as is' and without support. Enjoy the CD and the software on it!

NEWS

CONFIRMED KILL LIVES!

In development since 1997, this simulation was canned by Eidos last year. Some of the development team formed a new company and Imagination Unlimited is now continuing where Eidos left off.

Confirmed Kill should be serious competition for Fighter Ace II, Aces High and WW2 Online. With high fidelity flight models and good looking graphics, the appeal will be to the more serious crowd who want better looking models than Air Warrior or Warbirds currently offer.

The action will be team and mission based. For example, the Battle of Midway consists of six missions that require a team effort to be successful. Other arenas will include free-for-all and more historical scenarios.

The developers plan an extended public beta so that they can benefit from feedback and this

may be active by the time you read this. Beta participation will be free, and when this period ends the pricing structure will be

competitive with other online flight simulations. For more information have a look at http://www.iu.com ■

WORLD FLIGHT 2000
Around the world in three days

It's time to dig deep for charity and help to show what wonderful folk us flight simmers are! World Flight is a group of enthusiasts who are planning to complete a round the world trip,

non stop, using a sim. The team consists of real airline pilots, a dedicated team of organisers and, of course, a merry band of flight simmers. The event will be taking place on 3 November 2000 for a

period of three days and will be held in a built-to-scale Boeing 757 replica cockpit. To see 'one they made earlier' – take a look at our cockpit building feature on page 28 of this issue.

By putting our hobby and their enthusiasm together, they've created the World Flight Organisation to raise money for charity, a first for PC aviation and the Internet. This year the selected charity will be the Children in Need Appeal sponsored by the BBC.

How you can help

World Flight 2000 is a worldwide event and they have supporters from all around the globe who will be helping to make this year a success. Using Internet technology, not to mention PC Pilot's secure website, supporters can contribute via the link at www.world-flight.org or at www.pcpilot.net. ■

The WF2000 sim in action last year

Search and Rescue 2

A new version of this rather interesting helicopter sim has been published by Swing Entertainment. You take on the role of a rescue pilot and go on missions to retrieve benighted climbers and others from tricky situations. It's pitched as a game but the graphics look as good as Flight Simulator 2000 or Fly! Cost is around £25, first impressions are very favourable and we will be reviewing it in a future issue. Find out more from www.swing-games.de

New Perfect Flight 2000 Adventures

Adventure maker Marco Martini whose adventures have clocked up more than 2,500 downloads has announced that his new Perfect Flight 2000 series is available at his website. Anyone can request an adventure and he will try to accommodate that into a new file available for everyone. The first of these is a flight requested by Mathieu Jose, who requested a Qantas 747-400 flight from San Francisco to San Diego. This adventure has been made by Marco and is available for general download. If you would like to fly one of Marco's flights or would like to request an adventure flight then visit Marco Martini's website http://digilander.iol.it/avvmartini/pfadv.htm

The web is alive with the sites of simmers!

We're finding it hard to keep up with the plethora of new web sites coming online dedicated to flight simulation. It's a busy place out there and the competition's stiff from the bigger sites, but we all have to start somewhere so here's just a few that we were advised of since the last issue:
www.simm-stuff.00game.com, www.avionmagazine.com, www.fs2k2.com, www.tiptopstuff.co.uk, www.fs-2000.org.uk

VERTICAL CHALLENGER

A Just Flight Harrier - is that Cdr. Sharkey up there?

Just Flight have announced that they are soon to release an add-on dedicated to the Harrier jump jet in all its many variants. It's hard to believe that it's forty years (yes, 1960!) since the Harrier first took off, but the new program from Just Flight should be a bit more rapid in development. However, be warned lads – we're told by an inside source that when the Harrier prototype was finished the military said "it's perfect, don't do anything else to it, we want it as it is!" As a result, if you needed to change the engines on a Harrier, the wings had to come off

A Pucara panel. Could this mean Falklands missions in Combat Flight Simulator?

first! Just Flight advise that for total authenticity, they'll ensure that to get at the software you'll have to open the box! ∎

BOUND TO BE POPULAR

You've been asking, nay demanding, so after six issues we thought we ought to oblige! Yes, the PC Pilot binders are now on sale. Bound in a rather nice blue with the PC Pilot logo on the spine, they will look very handsome in the bookcase of any home and indicate that the owner is a discerning reader!

Prices for binders, which are high quality items with 'Cordex' to hold up to twelve issues (no nasty, cheap wires), are £6.99 each for UK residents, £9.99 overseas, all prices include postage.

They can be ordered from our website – www.pcpilot.net, or by phoning 0870 900 0422 – if you're calling from outside the UK, the number is +44 870 900 0422 and calls to PC Pilot are always at the normal national rate. ∎

FLY! ADD-ONS A-PLENTY

Hot on the heels of our review of two Fly! expansions in the last issue come more add-ons for the ever popular 'other' simulator. Readers have been telling us for ages that Fly! deserved some decent expansions and it seems like the commercial world is beginning to listen.

Aerosoft will soon be releasing a scenery add-on for Fly!. The scenery will be of the Rhein-Ruhr area, with 20 airports and very complex surrounding scenery mapped to 6 meters per pixel. This new product will be distributed in two ways, the first release will be just the scenery and should launch at the end of September. The second will release a week later and will include all the patches to upgrade the original version of

The skies of Fly! will soon be dotted with 777s

Fly! It will be released in both English and German versions, retailing at approximately £19 for the scenery pack and £31 for the scenery and patch version. Aerosoft live at www.aerosoft.de.

As if that wasn't enough, Precision Manuals Development Group have announced that a 777 will be joining their Airliner Series for Fly! They already produce a 757 and 767 and if the 777 is the same quality it should be a pretty impressive package. More information from www.precisionmanuals.com ∎

ProFlight 2000 and Ultimate Airlines

By the time you read this, ProFlight 2000 from Just Flight, one of the most eagerly anticipated enhancements for Flight Simulator 2000 this year, should be on sale. ProFlight brings your simulator skies to life with the sound of realistic and interactive air traffic control chatter. You can create fully interactive voice-controlled flights in any aircraft and any weather condition anywhere in the world. Owners of earlier versions will get the usual good value upgrade deal.

Just Flight are also developing Ultimate Airlines, which is a collection of 335,000 airline flights from every major airline in the world. Features will include every single scheduled airline flight, 335,000 unique flight plans for Flight Simulator 2000, as well as victor and jet routing. The flight plans can be exported ready to fly in Flight Simulator 2000 and they're also compatible with the new version of ProFlight 2000 where you will receive voice ATC for your flight. For details contact Just Flight at www.justflight.com

THAT'S FOR PEARL HARBOUR!

1942... THE BITTER REVENGE OF PEARL HARBOUR IS FLOODING THE PACIFIC... ROOKIES ARE NEEDED, FAST...   **MISSIONS ARE REAL... AIRCRAFT AUTHENTIC AND BATTLES FIERCE... CHANGE THE COURSE OF HISTORY**

www.combat2.co.uk

Microsoft®
Combat Flight Simulator 2
WW II Pacific Theater

Chuck Grimes looks on, as Lou Betti prepares to take another shot of the 172's main panel. Note that the front seats have been removed

From photograph to flight simulator - DreamFleet's Cessna 172 panel

DreamFleet's forthcoming Boeing 737 panel, viewed from the Captain's seat

THERE'S NO SUCH THING AS A FREE LUNCH!

Never could we be accused of avoiding contentious issues! As the debate rages between freeware and commercial product, we asked a prominent freeware designer, Lou Betti, who recently jumped ship to the commercial world, to give us his views. The result is more fuel on the flames from someone who's been on both sides of the fence.

I recently attended my first MicroWings conference, the annual gathering in the US of flight simulation enthusiasts. I had a wonderful time, made some new friends and learned quite a bit about the industry. I was certainly flattered when our Cessna 182 panel was given an 'honourable' mention in the MicroWings awards. Considering that the winner was a 767 panel for Fly!, it appeared as though DreamFleet did well with our first panel. I gave a presentation at the conference to explain a bit of what DreamFleet is all about, how we accomplish what we do and show some pretty pictures of our panels. Finally, I got around to dropping my bombshell: our Cessna 172 panel would be our last freeware panel, as DreamFleet would be going commercial for all future products.

There was not a single "boo", or collective sigh from the audience at all and I went on to explain that the costs involved in panel design at this level of detail, make it virtually impossible to continue as a freeware design group. Love of a hobby is one thing, but when you have to buy an expensive camera to photograph cockpits, spend thousands more on international phone calls, travel to airfields, spend time flying and finally, include the many hours of labour involved, it soon becomes a hobby for someone with a lot of spare cash.

The old saying "charity begins at home" comes to mind. It is doubtful that any other panel design group goes to the lengths and expense that DreamFleet does to produce its panels. We follow the philosophy that our panels must be the best, bar none and we strive to make each panel, in some way, better than the previous one. Some designers render their panels with 3D programs and achieve a perspective that leaves you sitting on the throttles. Instead, we put you in the pilot's seat, with a cockpit environment that is as close to the real thing as one can get.

Charity begins at home

As an illustration of the churlish attitude that surrounds the whole freeware/payware debate, I returned from the conference to learn that one freeware designer (who had even spoken to me quite cordially at MicroWings) contacted the entire membership of his group and announced that as DreamFleet was going commercial, the link to our site from theirs should be removed. He also found it necessary to refer to me as a 'jerk'. Indeed, this was most unprofessional conduct.

I was also contacted by another freeware panel designer, who mentioned our commercial move and then accused me of stealing a photograph used in a forthcoming DreamFleet panel. He actually had the audacity to ask me to prove him wrong! I did not have the heart to tell him that the burden of proof was on him, as he already ignored the fact that what he thought was his photograph, was actually my art work, done from scratch! It was all pure coincidence, nothing more. However, this designer saw the need to make his accusations public, before I had a chance to respond to him.

I have found that there are two types of freeware and commercial flight sim developers. On the commercial end, there are those in it strictly for the money, with quality mattering little and there are those who really strive to produce a product that is worth the money. The latter, in the commercial world, is very difficult to do. Ultimately, in the commercial flight sim world, only those who produce quality will survive; we have seen this time and time again. Stealing freeware work for a commercial product, as practiced by some commercial developers in the past, simply does not pay off in the long run.

Everything should be free

On the freeware side, there are those who just do it for the fun, often doing very nice work, and leave it at that. Conversely, there are those freeware supporters/organisations that are not only committed to freeware, but feel that almost everything in flight simulation should be free. Some go as far as verbally attacking commercial developers and publishers. I find this latter group of freeware supporters every bit as distasteful as commercial publishers who look to make money from shoddy work - shame on them both.

I flew for real, owning my own plane for many years and I'm afraid I have no empathy for those who feel everything in flight simulation must be for free. All of us at DreamFleet don't particularly support or oppose either freeware or commercial work. The only thing we actively support is quality and very often, quality comes at a price.

Flight simulation is evolving, and becoming ever more complex. Customers are demanding greater realism, in every area of the simulation, which invariably means higher expense in time and often in hard currency. Freeware developers have the advantage of time on their side. If it takes a year or more to produce a highly complex freeware add-on, so be it. This is not a luxury the commercial world can enjoy. Commercial developers and publishers have bills to pay and deadlines to meet, especially if a product is to be on the shelves in time for the all-important holiday season.

I was amused by a recent challenge, posted by a prominent freeware designer, to the commercial world. In essence, the gauntlet was to offer a product of similar quality to his own. On the surface, this challenge seemed logical, especially considering the quality of his freeware design. However, a look at the facts shows a different story. This freeware designer has spent well over a year on this product and had released several versions before the final one that was a true winner. Had a commercial developer used this method, they would have been ridiculed throughout the industry and perhaps gone bankrupt in the process. Of course, as this product was for free, the challenge can be made from a safe vantage point.

After a morning of photography, it's time to fly, as Lou pre-flights the 172

Can freeware keep up?

What freeware developers often fail to realise is that a similar challenge exists in reverse. Quality commercial developers and publishers (and yes, the quality ones are in the majority), are gearing up not only to produce high quality add-ons (the kind one always looked for from freeware), but to produce them in a timely manner that the public expects. The challenge is now whether freeware can keep up.

Seriously, what good is a product that takes so long to produce, its release comes just as the newest version of the simulator makes it obsolete? Consumers want quality and sophistication and they don't want to wait forever. Can freeware do this? I know the commercial world can, as we are already seeing it.

When Chris Arrington and I formed DreamFleet, it came from both a love of aviation and a dislike of many of the instrument panels then available. Our only goal was quality and in time, if we needed to charge, then so it would be. All of DreamFleet's members got their start doing freeware and continue to support freeware. Our move to the commercial end of the market was forced by the demand for realism from the buying public, the need to get this realism in their hands quickly and the costs involved in doing so. Huge profits did not enter our thinking. If you consider the relatively small market for some products and the expenses involved in producing them to the required quality, it's easy to see that this isn't a 'get rich quick' business.

Of course, this begs the question: does DreamFleet view freeware as competition, now that we are going commercial? Of course we do! However, we are keenly aware of the following facts:

There will always be those flight simulation users whose desire to get something for free, will allow them to sacrifice quality and sophistication, in return for no cost. Conversely, there are those who demand the best and are willing to pay for it, which is DreamFleet's (and most other commercial developers) market. We're unlikely to put freeware out of business and anyway, that would certainly be damaging to our hobby. Freeware is an essential part of flight simulation and we wish it a long life. Our goal is to produce the best, charge a fair price and ultimately provide the best value to the customer (yes, even better value than 'free'). Perhaps we will prove correct the saying "you get what you pay for". As one who is making the switch from freeware to commercial work, allow me to spread a few words of advice to the flight sim industry.

To the developers: concentrate on your product, and it's overall quality and realism. Based on some of the accolades bestowed on products that I consider generally mediocre, there is much room for improvement. Know when to make compromises in your design for the sake of useability and performance.

To the consumer: drop the freeware/payware debate, it's getting stale. Look only for quality and when the quality costs money, pay it and enjoy the product. I get a kick out of those who say a high quality, £20 add-on is expensive. Do you know what an hour of level D simulator time in a 777 goes for? Never mind the cost of renting the real plane for an hour! If you knew just what goes into a panel, aircraft and sound package, you would consider £20 to be a steal, it should be five times that!

I suspect we are entering an era where commercial products will replace freeware when it comes to superior quality and it is consumer demand that has brought this upon us. So, be prepared to take out your wallets and enjoy realism, quality, and sophistication, the likes of which have never been seen in flight simulation before. ∎

Lou Betti

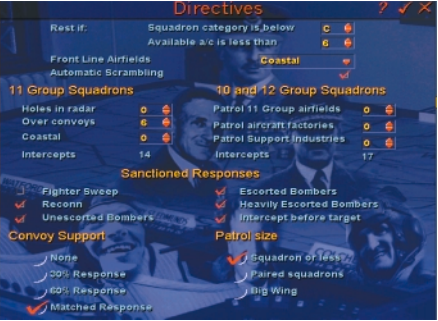*Lou Betti can be contacted by e-mail at loubetti@earlink.net*

Battle of Britain

Empire's finest hour?

Empire has a golden history of simulation production, with consistent quality releases since Dawn Patrol. More recently, Flying Corps and then MiG Alley both broke new ground with flight modelling and artificial intelligence. MiG Alley was set during the Korean War, one of the most interesting eras of air combat, when early jets fighters came into their own. It included the best recreations ever of aircraft like the F-80C Shooting Star, F-84E Thunderjet, F-86 and the MiG 15.

But MiG Alley was unique for another reason. It was the only other simulation in recent memory that allowed the player to influence a campaign at the strategic level. In the fifth campaign, the player could not only completely manage missions, aircraft allocation, and set targets, but also determine strategic priorities for the prosecution of the campaign. It came close to being two games in one.

Now developers Rowan Software, are taking this concept to the next level, with a real time campaign similar to that of Falcon 4.0. In Battle of Britain you can choose the Pilot campaign or the Commander campaign and fight for the RAF or the Luftwaffe. The campaign will progress through four phases and the Commander campaign allows the player to fly any mission they choose.

The simulation itself is claimed to be the most sophisticated ever produced by Rowan. The fully dynamic campaign means that mission variety will be endless, while the environment and damage will be persistent. For the RAF, radar and resources are critical. Mark Shaw of Rowan told us,

"The British were aware of the vulnerability of their key factories and made efforts to disperse production in hidden areas such as civilian workshops and other factories.

The Battle of Britain Campaign Directives for the RAF

The Campaign Map interface – all that's missing is some WAAF's to push the markers

We have simulated this dispersal in Battle of Britain. Losing a factory early on in the battle is critical; losing it later is not."

Your main assets are airfields. Each sector has one controlling station that houses the sector operations room. The rest are satellite airfields. If the sector station is hit and loses its operations and communications, then all airfields in the sector are impaired.

The campaign will continue to run whether you fly or not. Interaction is made possible via a strategic map interface modelled on the actual operations room maintained underground in London during the war. You can select the strategic game, the simulation, or both. The radio links to the operations room allow you to hear the battle as it unfolds.

Strategic management of the Commander's campaign is in levels: you can choose to go deep, or to leave most of the management

Plenty of training is provided, in contrast to the real battle
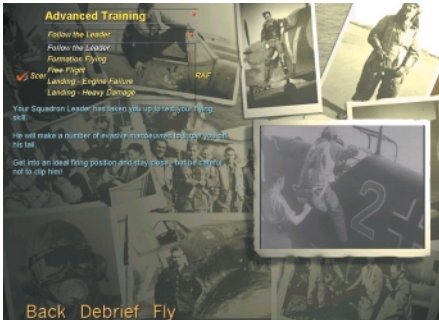
process automated. As in MiG Alley, the player can select strategic priorities, composition of flights, transfer squadrons and manage pilots, targets and resources. Information is accessed via dialogue boxes that supply new information as it is available. The player can even choose the frequency and type of information supplied.

Better yet, is the option to hop into any flyable aircraft from the war room interface at any time, or choose to fly scramble missions as they come up. The ability to interact strategically with the campaign means that the Luftwaffe will have the opportunity to rewrite history.

Because of the complexity of the simulation module, Battle of Britain has some extended training missions. Basic training includes takeoff, landing, and circuits. Advanced training includes formation flying and landing with damage or with engine failure. Other missions include dogfighting, ground attack and interceptions.

Battle of Britain will have five flyable aircraft: the Spitfire, Hurricane, Me-109, Me-110, and Ju-87. You can also man any one of the three main gun positions in a Do-17, He-111 or Ju-88.

One of the most notable features will be huge aerial battles, with up to 1,000 aircraft in the air at a time. MiG Alley was renowned for the best dogfighting ever

A Hurricane goes in for the kill

The graphics engine is extended beyond MiG Alley and should include much greater detail on the ground. Landscapes are recreated using data from original Ordnance Survey maps. Damage models for aircraft and objects are also improved. Tearing a wing off your aircraft now reveals the spars and internal structure. Flight models will show the same level of sophistication we saw in the previous simulation, although a new arcade option is also available.

User choice remains a strong point, with the ability to configure controls, views, flight model, weather, target size, enemy ability and more. Graphics options abound, with the added ability to choose the resolution of the interface. It's certainly helpful to run the strategic interface at 1280x960 resolution.

The feel is similar to Nations: Fighter Command, but Battle of Britain is feature-rich where Nations was notable for its omissions. Atmospheric enhancements are legion: clouds have been added and can be used strategically by both friend and foe. Empire has even gone to the trouble of recording radio messages in German for this one, with English subtitles!
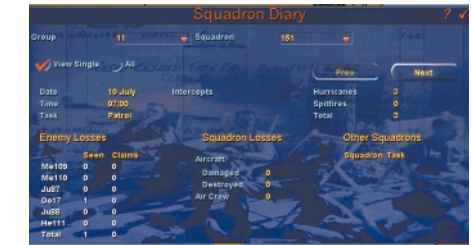
The RAF Squadron diary

Naturally, pilot and squadron records are maintained in great detail. Pulling up a dialogue box for a particular squadron offers separate information on the morale of the squadron and its leader. As in MiG Alley, choosing to fly a mission then involves other options. You can fly as squadron leader, or take a back seat in the action as a wingman. When the mission is complete, the Combat Report will present squadron and personal statistics. Unlike MiG Alley, Battle of Britain will also include a mission recorder.

One flew over the cuckoo's nest

A few of 'The Few' over London

produced, so Battle of Britain takes up that challenge and adds in the confusion of the huge aerial battles that took place over England. There are also Blenheims and Boulton-Paul Defiants flying around as well as some 'surprise' aircraft (hopefully not F-15s!). The flyable aircraft are very authentic, so don't expect to spend three hours over London in your Me-109 – you'll run out of fuel as fast as in a real one.

A Stuka squadron gets ready for an attack

Some modern history

The Developers of Battle of Britain, Rowan Software have been around a while and cut their teeth on simulations like Reach for the Skies, Operation Overlord and Dawn Patrol. Later, Flying Corps arrived and was one of the most impressive WWI simulations ever released.

Rowan's 'first Battle of Britain' – Reach for the Skies

More recently, MiG Alley was awarded the best flight sim of 1999 by a number of publications because it did so many things, yet did them all well. Allowing first person combat as well as tactical control, and modelling five great aircraft with a dynamic campaign, MiG Alley set a benchmark for combat flight simulations. Battle of Britain is a sensible follow up, especially in this 60th anniversary year of one of the turning points in modern history.

On the 16th August 1940, Winston Churchill visited General Ismay at the Ops Room of No 11 Group, Fighter Command. Ismay recalled:

'At one moment every single squadron and every single aircraft in the group was engaged; there was nothing in reserve and the map table showed new waves of attackers crossing the coast. I felt sick with fear. As the evening closed in, the fighting died down and we left by car for Chequers. Churchill's first words were, "Don't speak to me, I have never been so moved." After about five minutes he leaned forward and said, "Never in the field of human conflict was so much owed by so many to so few." The words burned into my brain.'

The Battle of Britain lasted for two months, from July 10th to September 15th, 1940, although the 'official' end was late October.

All that lay between Germany and the conquest of Britain was a narrow channel of water and a small force, composed mostly of Hurricanes, Spitfires the odd biplane and some Blenheims. The United States had not yet entered the war, but a small island nation proved far more intransigent than Hitler and his Luftwaffe had ever imagined.

Just as a huge ship can be directed by a tiny rudder, the course of history often turns on small events. What if there hadn't been a Spitfire? What if radar had not yet been invented? What if the Luftwaffe had not made their strategic blunders? Battle of Britain could provide you with some interesting answers.

An F-84 from the well received MiG Alley

A campaign map with directives in MiG Alley

Sound quality has increased over MiG Alley, due in part to the efforts of 'MeatWater', the same individual who created the excellent add-ons for European Air War. Cockpit interactivity has also arrived, and full engine management (including prop pitch) is available for those who prefer it. Force feedback is extensively supported, as was in MiG Alley.

Multiplayer sessions will be available in specially designed missions, with eight players supported per side. The player can take control of any aircraft in any of the 28 quick missions, flying in the same squadron or even leading a squadron of artificial intelligence pilots. Historical missions will also allow the eight players to operate in team play mode.

Battle of Britain from Empire looks an exciting oasis in a desert of new simulation titles around at the moment. It should give you the chance to see how the Battle of Britain might have turned out if you were in command or how you would have fared, taking part during that frantic summer of 1940. ■

Len Hjalmarson

Nose Gun Position

Turret Gun Position

The effective armament of the He-111. Not a lot when the Brylcreem boys are on your tail

The gunner's eye view from the Heinkel

Give us a smile! Keith Hartley, Test and Display Pilot for the Eurofighter Typhoon

Eurofighter Typhoon

Nothing stands in its way

The jet fighter is going through radical times. Combat aircraft are starting to diverge from conventional designs, with the F-117 Stealth Fighter, F-22 Raptor and Joint Strike Fighter looking positively space age. Each is highly optimised for a specific mission, and rightly so. However, the cost of such innovation can be huge, and so the Eurofighter consortium has opted for a more orthodox platform for the next generation fighter tasked with carrying Europe forward. So at least we'll be able to afford to buy more than one plane per country.

It may look more conventional than its American counterparts, but the Eurofighter Typhoon is just as advanced across the board. Aerodynamically unstable, with quad-redundant fly-by-wire control systems, voice-activated cockpit and super cruise capability means that it can hold its own in the sky for the foreseeable future. Designated as a Swing-Role aircraft, the Typhoon is not only superbly agile, but can deliver a hefty punch against ground and sea targets too.

Pull as hard as you can, the computers will make sure you don't break anything
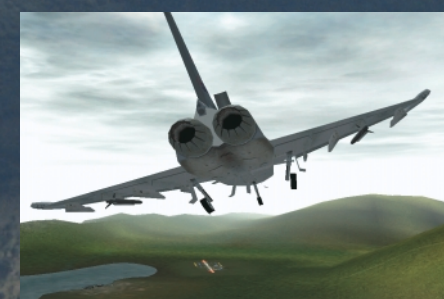
Home sweet home and you won't find an easier aircraft to land than this

Sukhois beware, there's a new kid in town

Digital Image Design already has two Eurofighter sims under its belt and while DID are now part of Rage Software it's still the same team. With their latest two titles, F22 Air Dominance Fighter and Total Air War, the Warrington-based crew has maintained their reputation as the best in the business. This time around they have the backing of Eurofighter International and more specifically BAe Systems, who are as excited as everybody else about this sim and have been getting their hands dirty helping out the Rage crew. Test pilots and engineers have been assisting the simulator team in all aspects of the design and it shows.

The external view of the Eurofighter shows off its sleek new lines, glistening in the Icelandic sun with a glint from the canopy glass. Constant twitching of the front canards and other control surfaces betray the automatic flight control system minutely trimming the aircraft to keep it stable. The texturing on these surfaces is so detailed that you can easily read the 'no step' signs and see all the panel joins. The polygon count is huge for the star attraction, with no jagged curves, just a

Even the Sukhoi is no match for the mighty Meteor Beyond Visual Range missile

smooth aerodynamic shape. The 3Dream graphics engine, debuted in Wargasm, runs beautifully at 1024x768 on a 300MHz Celeron and 8Mb Matrox G200 graphics card and this is only an early version. It bodes well for the future, as the development team are confident that the minimum Pentium II 266MHz spec will be perfectly playable, unlike certain other sims we could mention.

Eurofighter Typhoon dispenses with the 2D panel view, giving the pilot either a virtual cockpit that includes padlock views, or a full screen view with Multi-Function Displays appearing as simple overlays at the bottom of the screen. This may seem like a cop-out, but the Eurofighter test pilots say that this is a better depiction of what the pilot really focuses on while flying and fighting when scanning the panel. This demonstrates the shift in Rage's outlook on flight simulations. Rather than presenting mechanical reproductions of aircraft and their systems, they are now more concerned with delivering a rounded portrayal of the fighter pilot experience.

The best seat in the house

Mayday, mayday, I'm going down

The player is put in direct command of six pilots, who can be located and moved between different air bases. A slick pop-up menu at the bottom of the screen allows you to instantly switch personalities, hot footing it from one hot spot to another. The campaign runs in real time, so crew must spend time resting and planning, as well as flying to and from their targets. You can take part in these activities, including setting waypoints, weapons loadouts, as well as seeing them play pool and relaxing back at the base.

The campaign system is dynamic in that missions are generated depending on how the air and ground war is progressing. Set in Iceland during a massive East-West conflict in Europe, your task is critical in maintaining control of this key outpost. Fending off the invasion of Iceland means a good variety of missions, from simple combat air patrols and intercepts, to taking out fleets of Ekranoplan Caspian Sea Monster transports. A map view shows which sectors of the island are in enemy hands, and it is crucial that you keep track of this in case you have to bail-out. Inevitably your planes will be crippled during combat and ejecting over enemy territory is seriously bad for your health. At the start of the game you hand-pick your pilots, who have different

strengths and weaknesses. Some are good at survival and resisting interrogation, while others will buckle under pressure. SAS troops may step in to rescue downed pilots, but they have to stay alive under enemy custody to stand any chance. This type of role-playing element is tremendous and lifts this beyond being a simple flight combat simulator.

Flying the Eurofighter is a real joy. Incredibly responsive and packed full of pilot aids, it is a stress-free aircraft to keep in the air - until the missiles start coming of course. Even then, the advanced avionics warn you of time to impact and automatically throws out chaff and flares at the right moment. On the offensive, the latest smart munitions make mince meat of all but the most ardent of opponents. Once the war starts hotting up, the action is almost continuous as you hop from plane to plane.

Rage has managed to not only give us a superb looking simulation, but one that is also truly engrossing. By striking a balance between obsessive realism and playability, this looks like it will go a long way to introducing more of us to the joys of flying fast jets. ∎

Kenji Takeda

YOUR TURN TO BE THE C.O.

Let's go to work chaps – pay attention everyone

Keep tabs on where your pilots are, and how the ground war is going

The latest and greatest weaponry. Oh yeah?

Well done lad, now get out there and do it all over again

The war's hotting up. Let EBC News keep you in touch with events

I counted them all out... but one didn't come back

The Eurofighter Cockpit mock-up. Yes, the game does look exactly like this

Feeling nervous looking at the Longbow Apache from this angle. We hope that gun's not loaded

Parts not for sale, whole aircraft available from Eurofighter International. Price negotiable

The souped-up F-18E, an impressive flyer and at a bargain price

FUN AND FROLICS AT FARNBOROUGH 2000

Bigger, better and more spectacular every time, Farnborough Air Show is the place to see, first-hand, the latest aircraft from around the world. Over a quarter of a million people attended this year to enjoy the 167 aircraft on display and trade visitors haggled with 1150 exhibitors, spending over £35 billion. It was another memorable occasion, although events were overshadowed by the terrible Concorde tragedy that had journalists rushing to Farnborough for comments from the industry.

The star of the show was undoubtedly the Eurofighter Typhoon. In 1998 it performed a rather restrained flying display as it as still ramping up its flight test programme. This year was a different story. Test pilot Keith Hartley did a superb job of showing off the German DA1 aircraft. Spectators ogled at the incredible manoeuvrability and sheer power of Europe's flagship fighter. PC Pilot was lucky enough to speak with Keith and find out what he thought of Rage's game, just before he hopped into the cockpit for his display flight.

He was quick to highlight the close relationship that has developed between Rage and Eurofighter International. This has resulted in an accurate reproduction of the cockpit, and a game that is in synch with the real aircraft programme. Keith was convinced that the "underlying tactical side of the game is modelled very well", and that "Rage will almost certainly play a role in the RAF training programme" – praise indeed. He pointed out that it was in the decision-making process where PC games like Eurofighter Typhoon and Total Air War are most valuable. As Keith succinctly put it "you can teach monkeys to fly a plane, but it's teaching tactics that is far more difficult". As for the flight model, his thoughts were that "the general characteristics are good, although there's not enough inertia. There's more lag in the real aircraft". Something that has been adjusted for better game play, but will undoubtedly be tweaked by the development team before the final version.

Not only did we have the chance to chat with Keith, but we were also let loose on the Eurofighter Typhoon Cockpit Demonstrator. A full-size cockpit with wraparound screen, this is an awesome piece of kit. Taking off from Warton Aerodrome, home of Eurofighter in the UK, we banked hard over Blackpool to head out over the sea for a few rolls of our own. The joystick and throttle were incredibly stiff, although there was no force feedback. Heading back inland we set up a bombing run over Sellafield and landed a direct hit with a couple of Mk 83 bombs. With a huge grin on our faces we headed back to the airfield and managed a half-decent landing with a lot of help from the ILS and our instructor. What a ride! Soon we'll be able to do it every day thanks to the folks at Rage. Having flown the big sim we can safely say that the PC version captures the spirit of Eurofighter Typhoon wonderfully. We're just waiting for our invitation to fly in the real two-seater version now, just to do complete the job properly you understand.

To keep track of the latest news on the real Eurofighter Typhoon programme, check out the official web site at www.eurofighter-typhoon.com

Hot seat between planes with a deft click of the mouse

Airbus 2000 Special Edition

A lack lustre package from Pilot's

As flight sim enthusiasts settle into Microsoft's latest version, the producers of utilities and add-ons for Flight Simulator 2000 are mindful of the potential market for products that many of us originally bought for Flight Simulator '98. This in itself is sound commercial strategy, as long as the product is a genuine upgrade, both in content and compatibility. What is not acceptable is to roll out last year's version, simply tweaked to work with Flight Simulator 2000 and infer that is it quite different from the original.

This is precisely what Pilot's seem to have done with Airbus 2000 Special Edition. As far as we could tell, other than the addition of a few animations, both the aircraft models and flight decks appear to be exactly the same as the original offerings. The fuselages and engine pods are designed using eight sided polygons, the wheels look like black painted fifty pence pieces, which nicely match the windows, because they're black as well. There are no transparent textures, no remodelling of the airframes and certainly no improvement to the decidedly low quality bitmaps used on the flight decks, which were obviously taken from original photographs of the real cockpits. This results in a rather fuzzy and pixelated background that is not in the least bit realistic. While we're on the subject, the quality of some of the gauges leaves a lot to be desired, because the font size and style is far too chunky given the resolution capabilities of most modern PCs.

This package may have been acceptable a year ago but when far better aircraft are currently available free to download from the net, we begin to wonder whether Pilots are rather out of touch with current trends and their customers needs.

So having determined what this package is not, let's have a look at the content for those who perhaps didn't buy the original.

Airbus 2000 Special Edition contains an assortment of Airbus variants, from the A300 and 310 to the latest A340. These are provided in over 50 liveries, covering most of the major carriers, with cockpit interiors for the most part modelled on the original aircraft. In some cases this includes a novel jumpseat view to give you a different perspective. The authors have re-created the flight characteristics for each type and have provided a very comprehensive performance table at the end of the manual for those that like to calculate their own flight plans.

The package comes with its own installation routine, which unfortunately installs the whole package at once. A better option would have been to offer a choice of aircraft to install, allowing the 'Select Aircraft' menu in Flight Simulator to appear a bit quicker.

If companies like Pilot's want to retain their customer's loyalty they will have to provide more value for money than evident here. It would have been easy to commission an aircraft designer to make some new airframe models and cockpit interiors to improve the visuals, because essentially the textures used for the liveries are good. Instead, sadly, the whole package smacks of, 'let's dust it off and re-launch it'. ■

Joe Lavery

The cockpit bitmaps are based on the originals

The A319 has relatively few conventional instruments

Err… who's flying the plane? Must be lunch time!

This view highlights the chunky detailing

The big four-engined A340 taxies into Paris

Not very aerodynamic is it? Old-style modelling is used

REVIEW SCORE:	✈ ✈ ✈ ✈		
Publisher:	Just Flight	**Price:**	£19.99
Website:	www.justflight.com	**Release Date:**	Out Now
Developer:	Pilot's		

Pros: Worth a look for Airbus fans who haven't got the original.
Cons: The product is already out of date.

System Requirements: PII 266, 64MB RAM, 4 Mb graphics card
Recommended: PIII 550, 128MB RAM, 16Mb graphics card

East is east and west is west…

In March 1946, Winston Churchill made a speech in the USA and voiced the fear that was growing in the west about the spread of Russian influence in Europe:

"From Stettin in the Baltic, to Trieste in the Adriatic, an iron curtain has descended across the continent…."

From the end of WWII until the collapse of communism, a 'Cold War' was waged between the super powers of Nato and the Warsaw Pact. The balance of power drifted from one side to the other and every day World War III seemed just a press of a button away. Russian aircraft were regularly found lurking off the east coast of England and had to be chased away by the RAF. Both sides had long range bombers, ready to supplement the arsenal of intercontinental ballistic missiles with more traditional delivery methods for nuclear bombs. The results of this arms race (among other things) were some brilliant aircraft and a general distrust of foreign policies! This was a particularly frightening period of twentieth century history that (hopefully) ended with the fall of the Berlin Wall in 1989.

What the pilot saw from the cockpit of a B-52 – with a nuclear bomb on board it could have a view of Armageddon!

The Shackleton – successor to the Lancaster and known as "50,000 rivets flying in close formation!" by its crews

You can select the new missions from the normal screen in Combat Flight Simulator – ignore the Spitfires

---

AIR POWER THE COLD WAR

The Russian 'Bear' – they always look a bit dated when compared to a B-52

The F-102 Delta Dagger – not hard to see how it got its name

Warsaw Pack for Flight Sim

When we reviewed the web-only version of Air Power – The Cold War way back in Issue 4, we were disappointed to see that it had no new missions to fly with Combat Flight Simulator. Considering the real Cold War lasted over thirty years, we rather fancied pitting east against west in our own version of World War III – there's no fun in shooting down Me-109's with a Delta Dagger!

However, in answer to our prayers, Just Flight have taken this collection of 29 aircraft from the 1940s to the 1970s under their wing (pardon the pun) and re-published it with twenty new missions for Combat Flight Simulator, two new campaigns as well as a couple of new bases, one on each side of the Iron Curtain. It now comes packaged in a rather nice box (artwork by the renowned aviation artist Wilf Hardy) along with an excellent manual that is packed with facts about all the aircraft. Among other things it's fascinating to see how many of these aircraft are still in service. The Canberra and B-52 are now either side of their half century – that's like a Sopwith Camel taking part in the Vietnam War or a Hurricane in The Falklands!

The flight models for the new version of Air Power – The Cold War are greatly improved over the original program and it has become a very well rounded package now that you can enjoy its full potential in Combat Flight Simulator.

Many of the aircraft have the usual array of animated moving parts that one has come to expect from modern add-on packages. However, we rather liked the animated crew on some machines, who look left and right as you move the ailerons. This is a nice touch and, along with transparent propellers, puts Air Power – The Cold War up with other quality offerings from Just Flight like RAF 2000.

Installing Air Power couldn't be simpler and once it's finished you can either take a trip from the two new airfields (RAF Woodbridge or EGAF Schmoldow) in Flight Simulator or fly the missions from them in Combat Flight Simulator. A typical engagement is 'Bear Alert', where you must attempt a high altitude interception of three 'bears' (Tu 142's) and their escorts. This is all rather authentic, as back in the early 1970s the Daily Express famously carried a photograph on its front page of a smiling Russian air gunner waving at the cameras of an RAF interceptor from the tail of his Tupolev.

Our only criticism of this expansion is probably a bit subjective, but we were surprised at some of the aircraft that were included and omitted. As an example, the unusual six-engined B-36 (designed during World War II) is there and it's good to see something that's not particularly 'mainstream', although odd that the supersonic Lightning is excluded.

Overall, Air Power - The Cold War in its boxed incarnation is a much improved and good value package that goes a long way to capturing the spirit of the period. Of course, many of these aircraft also had distinguished careers in Vietnam and the Korean War, so perhaps it's time for some Combat Flight Simulator expansions to cover these two conflicts – a fair number of the aircraft are ready for take off! ■

Derek Smalls

REVIEW SCORE:	✈ ✈ ✈ ✈ ✈		
Publisher:	Just Flight	**Price:**	£24.99
Website:	www.justflight.com	**Release Date:**	Out Now
Developer:	Alpha Simulations		

Pros: New missions and improved flight models make this the perfect add on for baby boomers
Cons: Choice of aircraft is a 'eclectic' in places

System Requirements: PII 266, 32Mb RAM, 3D graphics card
Recommended: PIII 550, 128Mb RAM, 16Mb 3D graphics card

Aces High

Fancy your chances as an air gunner?

The pilot's view from the Zero

Your turn to join the crew

You can even throw up some flack

Before you dash out to your local shop and buy that new combat sim you've promised yourself, there is another way to spend your time engaged in aerial fighting without adding any more boxes to your shelves. Online gaming is yet to rival traditional versions in the UK until we get fast, cheap internet connections. However, many of us already have the luxury of speedy lines at little cost (look out, the boss is coming, get back to that spread sheet) so we thought we'd take a look at a couple of routine World War II online options that could provide an alternative to Combat Flight Simulator II, B-17 II and Battle of Britain. Is it better down the line or out of a box?

THE END OF THE 'OTHER' BATTLE OF BRITAIN

A SimGuild Spitfire – soon to be grounded

We were intending to review Battle of Britain from SimGuild alongside the other online combat products featured. However, at the beginning of September it was announced that SimGuild would be closing down and that their games would no longer be available after 30th September. We had SimGuild's Battle of Britain down for a rating of only two stars, a reflection of the somewhat outdated technology available. However, their many fans will be sorry to see them go and it will be interesting to see how the much hyped online gaming industry develops.

Aces High is the only online simulation we know of where your friends can join you as crew in the same aircraft. There are eight positions modelled in the B-17, including the bomb aimer and five in the B-26 Marauder. The level of detail is excellent and Roger Wilco provides real time voice communications for even more realism.

Aces High is a 12Mb download and about 30Mb once unzipped and installed. Offline use is free, as is eight player head to head and two weeks free trial is offered for online flying. However, once this is over you need to stump up $29.95 (about £19.00) a month to continue online.

There are currently fifteen fighters and bombers you can operate in Aces High, including the B-17, B-26, four variants of the Me-109, C-47A, Corsair, Fw-190, Lavochkin La-5, P-38L Lightning, Mustang, Spitfires, Zero and others. As well as aircraft there are also vehicles available, including the M-16 mobile flak wagon, the M-3 troop carrier and the Panzer IV Type H. The recent release of a terrain editor means that there will also be new territory to fight in.

The flight model in Aces High is excellent: torque, drag, fuel burn rates, stalls and spins, compressibility - it's all there. The one concession to reality is the addition of an auto trim feature, but you can still set trim manually if preferred. The graphics are great, including light source shading and up to 1600x1200 in 32-bit colour. Tracers are the best we've seen and the aircraft are beautiful and everything we flew had moving control surfaces, although the cockpits are really only adequate. However, the view system is one of the most flexible around, including ability to zoom in on any position and damage modelling is also highly detailed.

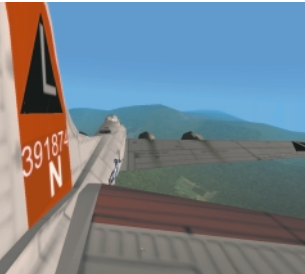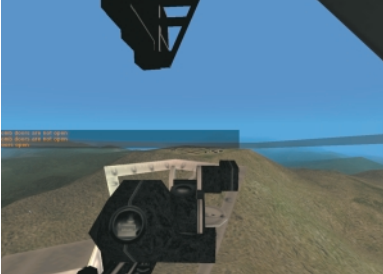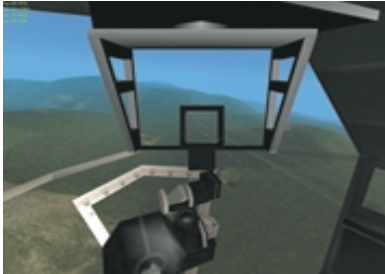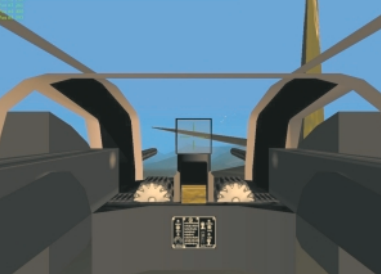Incredibly, the designers have managed to build a strategic game alongside the simulation and mission planning can be carried out in great detail. Each country has a

headquarters and a city, in addition to a number of airfields. The strategic objective is to take out an enemy country by capturing the airfields. When the enemy is down to a single field, the map will reset.

Particular targets have varied strategic importance. Bombing the enemy HQ will destroy their radar (and this requires a whopping big bomb strike). Bombing cities impacts repair time of factories and bombing factories in the city impacts down time of field structures. Taking out field structures affects the availability of fuel, troops, radar, ordnance, planes and vehicles. The final key to victory is using the C-47. After the defences are eliminated, dropping 10 troops from a C-47 over the base captures the field and yes, you can even join the infantry!

Overall, we found Aces High to be an extremely ambitious online simulation, which succeeds in almost every department. However, for something so complex, the online help is a bit limited, although the message boards are a great source of support. We also thought that £19.00 a month was pretty steep (if it was more affordable we'd give it a higher mark), in comparison to other online simulations – add that to your phone bill and the cost soon begins to climb. You pay (a fair bit) of your money and you take your choice! ■

Len Hjalmarson

REVIEW SCORE:	✈ ✈ ✈ ✈ ✈		
Supplier:	HiTech Creations	**Price:**	£19.00 per month approx.
Website:	www.hitechcreations.com	**Release Date:**	Out Now
Developer:	HiTech Creations		

Pros: Really has got something for everyone with the option to take on different roles

Cons: Limited help available and rather expensive

System Requirements: PII 450, 64Mb RAM, 16Mb 3D graphics card, D3d compatible sound card

Rear view of the Fortress

The B-26 Marauder in all its glory

Lining up through the Norden bombsight

Those tracers look pretty deadly…

Fighter Ace II   Join the Big Wing on the web

From our logbook: "Revving up the engines in my P-38, I flew down the runway and drew up my gear and flaps. The incoming enemy aircraft dove on me and managed a single hit on my wing. Although he had a superior turning radius his speed was against him, and I managed to get a couple of hits before he turned the tables. My P-38 was no match against the FW 190 in a turning fight, and I was forced to bail out. On return to base I mounted a more nimble steed in the form of a P-51D. When my opponent returned, I quickly severed his wing and then his aircraft exploded."

OUT OF THE BOX OR OVER THE PHONE?

The hype industry, responsible for things like the South Sea Bubble Company and the number of ex-dot.com millionaires sleeping rough in railway stations, have advised that the 'future of gaming' is online. Assuming (in the UK at least) that the promised cheap 24 hour internet access arrives, will we ever buy combat sims in a box again, or rely on sampling them by the hour?

There's no snap answer, but If you demand the highest fidelity in graphics and avionics modelling, you can't beat an 'out of the box' product. However, for maximum challenge and the ability to fly with your mates, online sims are hard to beat.

Microsoft's Fighter Ace II offers levels of realism that you can set yourself and great graphics. The terrain is incredible. We could spend hours in this simulation and not notice the time drifting by. Music to the ears of your telephone company, without a doubt.

In fact, BT aren't the only ones, Microsoft wants YOU as well. A three-day free trial is a great way to learn the ropes in Fighter Ace II and the 17Mb download is worth the effort, the full installation taking up about 33Mb on your hard drive.

When we first entered the Fighter Ace area on the Gaming Zone, we found about 650 pilots in the arena. We decided to try the Territorial Combat Arena, where each side must defend its bases and supply routes. The arena we chose was set for middle realism, with torque, stalls and spins disabled.

Once in the cockpit, we adjusted the resolution to maximum (1024x768) and calibrated the rudder pedals. Then, choosing the P-51 Mustang, we set our gun convergence at 200 yards and fuel at 380 kg. 65 pilots were defending their four territories when we got airborne in the Mustang.

View options abound. You can fly with gauges on screen from an outside view, and your 8-way hat (if your stick has one) will give you snap views as if you were sitting in the cockpit. The traditional forward cockpit view is slewable with your mouse and becomes a padlock view using the F4 key. If you're new to all this, a padlock view is one that keeps the view focused on your opponent all the time, and this works well in Fighter Ace II.

Your hat switch will still take you instantly to the cardinal views. Damage modelling is highly detailed and the sound is excellent.

For additional situational awareness, you can fly with the full screen no cockpit view with a small radar scope in the lower right. When enemies approach they show as a small coloured dot (this option isn't

available in full realism mode) and for an AWACS perspective, access the Tactical Map with the 'M' key.

Help is accessed via the F1 key, showing a full list of keyboard commands. There are four radio channels and you can join a team as soon as you enter. If you need some practice, fly offline against AI (artificial intelligence) opponents and become familiar with the views and padlock system. If you have a force feedback stick, you'll enjoy the experience even more.

When you are ready for the maximum challenge, you can join the Advanced Territorial Combat arena. You'll find the flight model demanding and the opposition stiff. Choose the British, the Americans, the Russians or the Germans and find out if you have the 'right stuff'. Tally ho!

All in all, Microsoft's online combat arena is the place to be for a well executed and good value way to make friends (and shoot them down).

The final word from our logbook… "It was time to attempt a foray into enemy territory. Lady Luck smiled on me, as I found an undefended supply train… undefended, that is except for the mounted flak guns! I took out the locomotive but the kite sustained some hits, so I had to bail out! It was going to be a long walk back home, dressed as a Belgian electrician and pushing my bicycle towards the Swiss border!" ■

Len Hjalmarson

Ready to roll in the P-51D

Bandit at 12 o'clock high

On the tail of the bandit

REVIEW SCORE:	✈ ✈ ✈ ✈ ✈		
Supplier:	Microsoft Gaming Zone and VR-1	**Price:**	£6.50 per month (approx.)
Website:	www.zone.com/fighterace	**Release Date:**	Out Now
Developer:	Microsoft		

Pros: Overall excellence and great fun but still choose your level of entry.

Cons: Less experienced pilots will ride the silk a great deal. Occasional dump to the interface can be frustrating.

System Requirements: PII 300, 48MB RAM, 56K modem or faster, 16MB 3d graphics card

The Gaming Zone, with the online arena and Fighter Ace HQ and map territory

FS Commander

The All-In-One Add-on

As a rule GA (general aviation) pilots fall into two groups. Regardless of whether they fly real aircraft or simulated, they usually have a preference for VFR (Visual Flight Rules), or IFR (Instrument Flying Rules) flying. The VFR pilot is something of an adventurous spirit who for the most part is a fine weather flyer, whereas the IFR pilot can cope with most weather conditions and considers cloud cover and blustery winds to be a challenge to his instrument skills. Whichever group you belong to, the latest release from Aerosoft will certainly be of interest, because it offers a range of utilities that would suit any pilot.

FlightSim Commander is billed as the All-In-One add-on for Flight Simulator 2000, providing superior flight planning, navigation, approach charts, ATC and scenery viewing. These utilities are packaged into a common interface that launches the primary components, which then have menu options leading to the other elements. They begin with the map window, where you define your preferred geographical region and starting location. If you are creating a flight plan then the departure airport will be centred when you enter the map screen. It will also show any VORs, NDBs, ILS, airports, reporting points, routes, control zones and taxiways. Obviously this can become rather cluttered, so the authors have provided a row of selection icons on the menu bar, so you can decide which elements will be displayed. The Page Up/Down keys control the zoom level, which naturally will also make a difference to the amount of information you see.

One of the icons opens the airport preview window to show the runway designation, taxiways and general schematics for any airport in the database. The same keys as before are used to zoom the display, which can also be printed and used to find your way to the stand on arrival at your destination. Another icon launches the flight plan window, where you have the option of generating fully automatic or manual flight plans. These can be direct to a destination, or via any number of waypoints or intersections. You can define the plan by the conventional method of choosing departure and destination airports, or by simply clicking the points you want to use on the map.

The package also includes ATC, but no matter how we configured it we could not get this to work on our system. Random chatter worked fine, providing realistic background radio traffic to each flight but actual ATC eluded us.

Once the plan is complete you can open the SID (standard instrument departure) and STAR (standard instrument arrival) window to see a graphic representation of the departure and destination segments of your flight. In the same way the runway window shows similar displays of the pertinent runways, which include a Jeppesen style approach chart at the bottom.

The plan must be saved within the Pilot's directory of Flight Simulator 2000 before you can use it but once loaded it can provide a new GPS and Moving Map display within the Flight Simulator environment. You have to load the plan in Flight Simulator 2000, then switch to FS Commander and select the GPS option, at which point a small GPS window opens that sits on top of the Flight Simulator display. From here you can access all the autopilot functions and open a moving map display controlled by FS Commander. The new window in effect takes over control of the inbuilt autopilot functions.

FS Commander also provides two other options, firstly a Weather window, which is independent of the other features. In this window you can create weather situations that are not necessarily connected to a plan, although they can be if you wish. Secondly, there's a Procedural window that allows you to define a holding pattern around a VOR, so you can practice those precision racetrack patterns. The program also provides printout options for most screens, from the map or flight plan itself, to the fuel flow specs of any Flight Simulator aircraft.
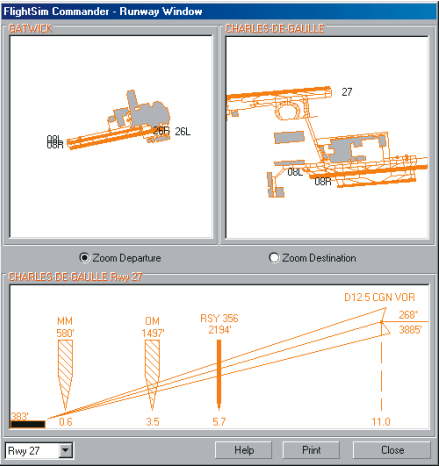
All in all this is a comprehensive package that, with the exception of ATC' delivers what it promises. Although some of its utilities are already provided by Flight Simulator 2000, it still remains reasonably good value. ■

Joe Lavery
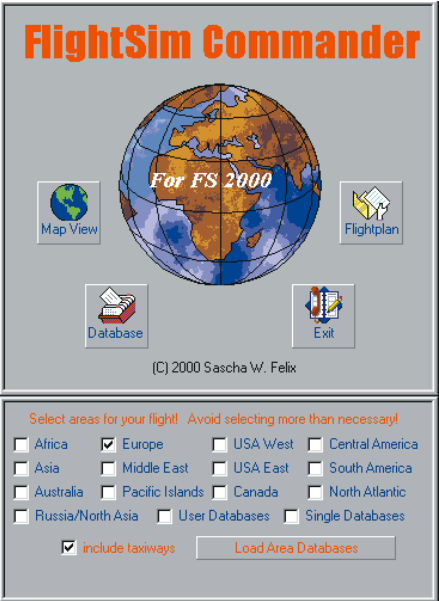
Aerosoft claim FS Commander is checklist 'Himmel'!
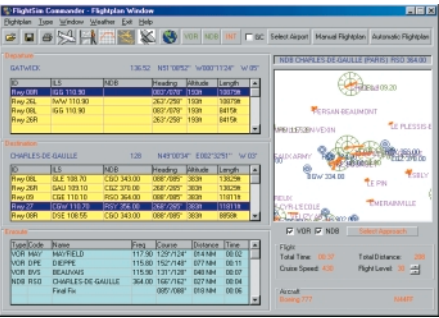
You load the completed plan using the normal planning screen in Flight Simulator

The completed plan showing all possible runway data at both departure and destination airports

Cleared for takeoff!

REVIEW SCORE:		
Publisher:	Aerosoft	**Price:** £25.00
Website:	www.aerosoft.de	**Release Date:** Out Now
Developer:	Sascha Felix	

Pros: Provides FS2000 users with a wide range of utilities to enhance their flying experiences   **Cons:** You need to be a fairly proficient pilot to make use of all its features.

System Requirements: PII 300, 64Mb RAM, 2 Mb graphics card
Recommended: PIII 550, 128Mb RAM, 16Mb 3D graphics card

DreamFleet Cessna 182 RG panel
A dream of a panel

There are a huge number of freeware designers out there, who spend countless hours creating accurate renditions of aircraft, scenery and flight decks, with little or no reward for their efforts. Some of these add-ons, as we've seen before, can show the professionals how it should be done. This is certainly the case with the latest release from DreamFleet, a photorealistic Flight Simulator panel for the Cessna 182 RG.

In case you didn't know, DreamFleet began as a group of enthusiasts who were dissatisfied with the quality of the default cockpits supplied by Microsoft and decided to do something about it. The two founder members Chris Arrington and Lou Betti began work on their first cockpit in early 1999, the much-talked about Cessna 182C panel. Their latest offering is an improved version of that panel, modified for the retractable gear Cessna 182 RG. It includes better gauge readability, a superior background bitmap (although the original was a vast improvement on the Microsoft version already) and now incorporates the Flight Simulator 2000 GPS. Like its predecessor, it comes with its own installation program called the DreamFleet Manager, which the authors supply to help you install the panel correctly and also any others you may get from DreamFleet. It also ensures that if you ever decide to remove it, then the files that were automatically backed up on installation will be reinstated.

The panel is a beautiful rendition of the real 182 RG panel, right down to the working rocker switches and custom radio stack with swap frequencies. In addition, the authors have made a few other improvements on the original to make life easier for the pilot, including a custom made autopilot with altitude hold (not available before). They have also addressed a complaint made about their earlier panel, where users of small monitors found it difficult to see some of the gauges. In this panel the primary gauges have a single click zoom option to give you far better readability. They have also added a new virtual panel view where the primary gauges still operate correctly. Other designers simply show a non-functioning bitmap. Like it's predecessor, the RG panel comes with an extensive range of documentation, including screen shots, to explain how all the controls are accessed.

This is an excellent addition to Flight Simulator 2000, especially considering it's free - to anyone with free internet access! However it appears that the lure of the commercial world has gripped DreamFleet who we understand are not going to release any further panels as freeware. If you want to sample their forthcoming 737 panel it seems you'll probably have to pay for it. ■

Joe Lavery

Some of the gauges can be expanded for clarity

The authors have added new night lighting to the panel

Virtual cockpit view gives better visibility when landing

This view shows the default GPS with control yoke removed

The RG 182 supplied with the package

REVIEW SCORE:		
Publisher:	DreamFleet 2000	**Price:** FREE
Developer:	DreamFleet	**Release Date:** Out Now
Website:	http://flightsimmers.net/airport/dreamfleet/panels	

Pros: A complete makeover for the Cessna panel and it's free   **Cons:** Can be a frame hogger for low spec machines

System Requirements: PII 350, 64Mb RAM
Recommended: PIII 450, 128MB RAM, 16Mb 3D graphics card

LET'S HAVE A LOOK AROUND
THE COCKPIT

The main panel

The co-pilot's view

The back seat driver's area

A look downwards - nice shoes!

It even displays the authentic tired look of a club aircraft

Boeing 777-200

Now's your chance to captain a 777

A quick browse around the file libraries of the popular websites will yield dozens if not hundreds of different jet airliners to download, from every conceivable carrier (unless they've got an 'exclusive' agreement with a publisher and are preparing to sue…), so the release of yet another airliner is not exactly earth-shattering news. However, (you knew there was a 'however' didn't you?) the latest offering from Phoenix-Simulations is something a bit special. It's a Boeing 777-200 that is the culmination of months of solid work by a team of ten people, painted in both United Airlines and Aeroflot liveries, complete with a highly detailed cockpit panel and a brand new sound set.

Nothing remarkable so far, but let's take a closer look. Starting with the aircraft itself, you'll find that the modelling of the airframe and body shape is better than anything available out of a box. A close examination of the undercarriage and wing structures reveals an unprecedented level of detail. There are realistic hydraulic lines and textured tyres, flaps that don't simply flick down but slide out and rotate exactly as they do on the real aircraft. The same applies to the spoilers on the front edge of the wings, the speed brakes and the reverse thrust cowlings on the engines.

If you look at the screen shots you'll see that the Phoenix-Simulations paint shop have set a few standards of their own, with the liveries of the respective airlines faithfully reproduced, complete with night time illuminations.

Moving to the interior you have a cockpit panel that rivals the superb Real CRT panels from Tony D'Ambrosio. With three high-resolution MFD's (Multi Function Displays) that show both the familiar navigation instruments and the overall aircraft and engine status. Below these is the throttle quadrant with a further MFD above the FMC (Flight Management Computer), which is a respectable rendition of the on board FMC, although it doesn't emulate every function of the real instrument.

Having said that, it has a complete ICAO database, so you can easily input and execute your flight plans or combine them with the Flight Simulator flight planner if you prefer.
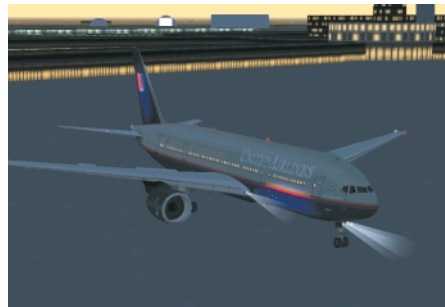
The authors have depicted the overhead panel, complete with the familiar rows of switches, buttons and lights that control, among other things, the fuel management, hydraulics, engine start and electrical power systems. The attention to detail stretches to the point where you're required to carry out a proper start sequence before you can start the engines, although if you adhere to the 'jump in and go' philosophy, then there's a quick start option too. Phoenix-Simulations have fitted their 777 with a multi function radio panel that takes the place of the more familiar radio stack. This has a row of selector buttons for choosing the function you want, with two display panels immediately above that show both the active and standby frequencies.

If Phoenix-Simulations have modelled the flight characteristics of the 777 as accurately as the rest, then the real aircraft must be a dream to fly. As long as you adhere to the limitations outlined in the manual and respect its size, it will climb gracefully into the air and take you wherever you want to go. In fact, it handles far better than some real light aircraft we've flown. Incidentally, if all this is making you feel a bit apprehensive about your ability to handle such a craft, then you should have a look at the manual provided by Phoenix. It contains an excellent tutorial that explains in simple terms how to use the somewhat complex flight controls and includes pictures of the FMC in typical configurations.
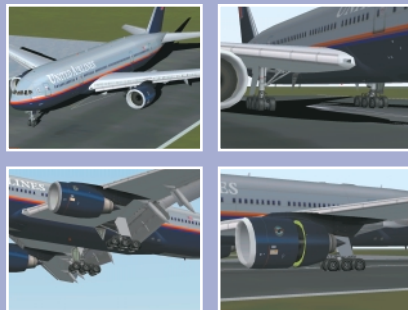
The Phoenix 777 has really set the benchmark for the next generation of Flight Simulator aircraft and for this level of detail, we think it's well worth the starting price of £15 (extra liveries cost more), made up of £5 per module for aircraft, panel and sound set.

Joe Lavery

A CLOSER LOOK AT THE DETAIL LEVEL

THE FLIGHT DECK IS EQUALLY IMPRESSIVE

Cruising over the south of England

Some more clever lighting effects

Full flaps extended for landing

REVIEW SCORE:

Publisher:	Phoenix Simulations
Website:	www.phoenix-simulation.co.uk
Developer:	Phoenix Simulations
Price:	£5 per module via download
Release Date:	Out Now

Pros: One of the finest single aircraft products yet developed.
Cons: Needs a respectable PC to get the best from it. Extra liveries cost more.

System Requirements: P II/III 450, 128Mb RAM, 16Mb 3D graphics card
Recommended: P III 700, 128Mb RAM, 32Mb 3D graphics card

Beech Bonanza

The flying equivalent of a people carrier! A high quality rendition of a popular aircraft for Flight Simulator 2000 from Phoenix Simulations

The Bonanza series is the second product on offer from Phoenix Simulations and it gives Flight Simulator pilots the chance to fly one of the most prestigious light singles in the air. The Bonanza was built by Beech and flown for the first time on 22 December 1945, the V tail prototype aircraft was designated the Model 35. This became the original Bonanza, which was in production for over 35 years and was powered by a Continental 285 HP powerplant, with a cruising speed of 157 mph and a service ceiling of 17,860 ft. It was replaced by a conventional tailed model called the E33 and eventually joined by the six-seater model 36 in 1968. All three aircraft are coveted by private pilots because they are more comfortable, generally better equipped and a joy to fly when compared to similar club aircraft.

Phoenix has recreated all three of these aircraft to a high detail level both inside and out, with fully operational moving parts, completely fitted interiors and a well-balanced flight model. Closer inspection of the airframe highlights the attention to detail. Features abound, like the protruding exhaust underneath the engine cowling, small struts and braces on the undercarriage, properly modelled antenna...the list goes on.

To complete the package Phoenix has also created three instrument panels for the different models, which naturally have slight variations in the equipment they carry. Once again, these panels are graphically better than those found in many mainstream commercial packages, with the backdrops created from hand drawn images, not touched up, digitised photographs. The gauges and other avionics are clearly defined, with easily read fonts obviously chosen to suit the application. At the end of the day this dedication to detail makes flying these aircraft an altogether more realistic experience.

Each aircraft comes with it's own detailed manual in Microsoft Word format, complete with a potted history of the plane, a full list of specifications and a checklist that looks remarkably authentic. A second document is dedicated to the panel, outlining the instrumentation, with detailed full colour illustrations that show where each instrument is placed. This is followed by a comprehensive description of each instrument, its function and how its controls are accessed from the Flight Simulator environment. Space is also devoted to the function of the GPS instrument on board the aircraft, how it works and a step by step tutorial of how to create, edit and finally initialise a flight plan. In fact for anyone unfamiliar with the mysteries of GPS operation and flight planning, the tutorial is probably worth the price alone, although not as good value as this issue of PC Pilot, where you'll find features on both subjects!

Joe Lavery

THE ORIGINAL V TAIL MODEL 35V

THE ROOMY 6-SEAT MODEL 36J

THE MORE CONVENTIONAL MODEL 33C AEROBAT

REVIEW SCORE:

Publisher:	Phoenix Simulations
Website:	www.phoenix-simulation.co.uk
Developer:	Phoenix Simulations
Price:	£10 per variant via download
Release Date:	Out Now

Pros: A superb machine in every detail.
Cons: Not cheap at £10 each.

System Requirements: P II/III 450, 128Mb RAM, 16Mb 3D graphics card
Recommended: P III 700, 128Mb RAM, 32Mb 3D graphics card

MAD DOG 2000 EDITION

We're all off to sunny Spain...

Impressions from the Captain's seat

If you regularly fly the heavy jets in Microsoft Flight Simulator, you will be used to diving into the plane, taking off and flying without worrying too much about the complexities of engine starts, air conditioning or the hydraulic system. It's all a bit too simple to really get the flavour of commercial flying.

Enter Mad Dog from Lago, now being distributed by Just Flight. We previously reviewed this add-on version of the Boeing MD-80 for Flight Simulator 98 in the first issue of PC Pilot, so with the advent of the Flight Simulator 2000 version, it seemed appropriate to look under the surface a little. Our original review said it was pretty good with nice graphics as well as excellent panels and all that remains much the same. This time, we'll take the plane for more of a spin and let you know what it's like to fly. The software contains several versions of the MD-80, but in essence there are two categories – the standard and the expert. Here we will concentrate on the expert version, as this has all the features of the standard, but with a lot extra to handle as well.

It can get quite crowded – Mad Dog includes flying 'neighbours'

As always, you start off your flight by entering the cockpit (i.e. loading the plane or situation) and that's about as much as is standard for this plane, because pressing Control+E to start the engines has no effect whatsoever. The only things functional at this stage are the batteries and you will have to progress through a sequence of logical steps to get the plane flying. The first step is to turn on the auxiliary fuel pump and then start the APU (auxiliary power unit). The APU is a small gas turbine mounted in the tail of most planes. Once you have the APU operational you can supply the plane with power via the electrical buses. The aircraft is still immobile, but all the bells and whistles are starting to work.

The next step, again novel to Mad Dog, is to instruct your staff to load the passengers, food and cargo. While you are doing this, there are a whole host of

A dead panel confronts you as you sit down – to wake it up you'll need to know what you're doing

The Mad Dog in its kennel waiting for a chance to go for walkies!

Everything's working now (hopefully) as we come in for a night time landing

Planes included are all variants of the Boeing MD Super 80 series, which are all stretched and modernised versions of the McDonnell Douglas DC-9. The planes included in Mad Dog are the MD-82, MD-83, MD-87 and MD-88, and they are supplied in several different liveries.

The dog awakes!

checks that you will need to carry out before you can be sure that the plane is fully functional. By the time you have done them, the cabin crew will doubtless have spoken to you and let you know that the plane has been loaded. Switch on the seat belts signs and then call for push back from the ground staff. Once pushed away from the stand you are cleared for engine start. Again, if you don't follow the right procedure, the engines won't start. For example, the air conditioning takes air from the APU and if you leave it switched on there won't be enough air pressure to start the main engines.

Before take off, you will also need to set up the thrust rating computer and the FGS (flight guidance system). These are significantly more sophisticated versions of similar devices found on the standard Microsoft offering. The FGS has six modes of operation that are normally worked in conjunction with the EPRL (engine pressure ratio limiter) for yet more sophistication.

Once on the runway and with everything set and checked as detailed in the lengthy and essential operating manual, the throttles are set and the take off roll commences. As you pass the relevant speeds, you hear your co-pilot calling 80 knots, V1 and Rotate.

The climb away from the runway is the first opportunity to check the handling characteristics of the plane, which feels suitably heavy and realistic, but the real fun starts when you want to engage the autopilot. The concept is different to the simplified version found on the standard Flight Simulator planes. Everything is controlled via the flight guidance system, which has several new functions that mimic more of the systems found in the real thing. For example you can set a fixed speed and then control vertical speed with the throttle. This only touches the surface of the capabilities, as the FGS is one of the most realistic and sophisticated you will find on any PC simulator. It may take you some time to learn how to use it effectively, but once you have mastered it you will find the plane far easier to manage, which is why the real thing has it.

The aircraft's handling throughout the cruise and descent is exemplary, however this is not usually an issue. The handling on the instrument approach and landing is equally commendable, and the plane feels more solid and predictable than the standard Flight Simulator 2000 heavy jets. Once on finals it is easy to line up with the approach lighting (that's what the lights are for) and consequently the landing is

straightforward. The cabin crew detect when you are approaching for landing and give the obligatory calmly spoken briefing to your passengers, which is a nice touch as you fight the cross wind and turbulence.

Overall, this is a very competent add-on for Flight Simulator 2000. In fact, there is so much more to manage when flying this MD-80 that it almost feels like a different simulator. It is a far cry from most of the normal add-on planes you can buy. For example there are about 25 functioning switches on the overhead panel alone, a 'Bitching Betty' voice annunciator that tells you when you are flying outside required operating parameters and a flight mode annunciator with over 40 messages. So, if you like flying heavy metal in Flight Simulator 2000, but want something give more of the flavour of operating in the commercial world, the Mad Dog package is well worth your consideration. ■

Stephen Heyworth

REVIEW SCORE:

Publisher:	Lago	**Price:**	£34.99
Website:	www.justflight.com	**Release Date:**	Out Now
Developer:	Lago		

Pros: Like a new plane, not just a new panel and colour scheme. Standard and expert planes for progression.

Cons: Small differences between planes. The Manual could be better organised.

System Requirements: Pentium 233, 64Mb RAM
Recommended: P III 450, 128Mb RAM, 16Mb graphics card

CLOSER TO REALITY

No matter how realistic flight simulation becomes, if you are sitting at a desk staring at a monitor and typing on a keyboard, it is always difficult to convince your senses that you are actually in an aeroplane.

The solution to this problem is to create your own cockpit, shut out the external distractions and immerse yourself in a simulated world. However, this isn't as simple as it sounds. There are many commercial products available to help create your own cockpit, from simple keyboard covers to full-motion set ups that you'll need a house the size of a hangar to accommodate.

We've had lots of mail asking for a feature on cockpit building and with such a huge subject, we thought the best approach would be to take a look at three different home-built setups of varying complexity. We'll pass on some useful hints from the builders and hopefully whet your appetites for your own building project. We've interviewed a huge number of cockpit builders for this feature and would like to express our thanks to everyone who gave us information, even if we weren't able to feature everyone's pride and joy.

How, where, when, why and how much?

Before you start getting too involved and phoning Boeing to ask about spares availability, you need to decide what it is you want to achieve, set a budget, set a time scale and try to stick to them. Of course, these sensible thoughts are easily voiced, but many of those we interviewed for this article warned that building cockpits is very addictive and it won't be long before you want to improve on your creation. A crucial point to get clear is how confident you feel about doing the work yourself. Whilst most of the cockpit builders we spoke to said that the

construction is fairly straightforward, knowing one end of a drill from another is important. It is also essential to know a bit about the inner workings of your PC if you want to use multiple monitors and replace your keyboard with real switches and levers.

It's always best to start off in the right frame of mind and firstly you need to decide what sort of flying you like best. It's pretty obvious that if you spend most of your time piloting Spitfires in Combat Flight Simulator, attempting to build a Jumbo Jet cockpit will be less than satisfying. You can of course sacrifice some authenticity and create a cockpit environment that will suit pretty much any sort of flying. The choice ultimately depends on your budget.

Tony Jones' kit ready for installation

To work out the cost, the old civil servants' rule for public works applies: "estimate the cost, double it and then work out the cost of getting it up to date because it's taken a lot longer than you expected". In reality, a good home built cockpit is a hobby and part of the satisfaction comes from constantly improving it. The cost can be as high or as low as you want, but the best advice is to upgrade gradually, rather than expensive wholesale replacement. As a guide, some very good yokes and pedals can be yours for £300-£500, a projection monitor for £1,500, a magnifying lens is around £100 and the rest (for the home builder) is available very cheaply, as long as you know where to look! The bit you can't price up so easily is your time and this will ultimately decide the scale of your creation.

Finally, the location is also fairly crucial. If you have the luxury of a spare room, to do with as you please, then you've solved a big problem early on. However, a decent cockpit set up is generally not very portable, so a permanent home is desirable. Remember, sheds get damp and lofts although dark, which is useful, get very hot, so make sure your cockpit has a good home before you start work. Hard wiring everything together is a great idea, unless you plan to move house in a few months. You have been warned!

The simple approach

In the RAF, the term 'flying a desk' usually referred to carrying out administrative or clerical work. However, Tony Jones decided to convert his desk into a cockpit with the idea of making his flight simulation a bit more realistic, without actually building a permanent cockpit. He started experimenting with hoods over monitors and the final result is a desk/seat cockpit set up that you see here.

Here's one Tony made earlier...

The key to Tony Jones's cockpit is the integration of the stick and throttle with the seat rather than the desktop. This is a fast jet combat cockpit so the joystick becomes a side-stick controller with the throttle falling immediately to hand on the other side – just like a modern fighter. The stick and throttle are recessed into the side consoles, eliminating 'kinked wrist syndrome', and the resulting forearm support gives increased sensitivity and control - not to mention superior performance under high G loads! As in a real aircraft, you relax back in the seat rather than having to lean forward all the time. The mouse pad sits on a little desk extension just above your knees, so everything you need is within the confines of the cockpit – about as close to real HOTAS (hands on throttle and stick) as you can get with a PC.

Integrating the controls with the seat also frees up a lot of desk space. In this example, two Quickshot Masterpilot keyboard emulators are mounted on brackets simply sandwiched between the monitor base and its stand, but the design allows for other accessories, or even the keyboard to be placed here. Another big advantage is that the cowling around the monitor simply lifts off if you need to convert your cockpit to a normal desk for more mundane tasks and you don't need to move the controls out of the way either.

It's been so popular with friends that Tony has been persuaded to 'go commercial' and offer copies of his 'desk' for sale. Individually hand-built versions of this cockpit, including a plain desk without drawers and a slightly different chair are around £225. It's also available in WWII format with a central joystick and a civil variant with a squared-off cowling for mounting a flight yoke in the conventional position. With a central stick, the mouse (or trackball) moves to one of the vacant side consoles.

This is certainly a good step on the road to cockpit building and improves the realism without the need for a spare room.

The outside of the Captain Atkins cockpit where the 'instructor' resides. Everything can be controlled from out here. The cockpit itself is the black box at the back and the entrance is just behind the globe

A close-up of Tony's completed cockpit

The theory of evolution

When we visited retired British Airways Captain, Doug Atkins we weren't sure what to expect. Another retired Captain informed us that this 'simulator', albeit on a limited budget, rivalled the multi million pound monsters used by modern airlines. While this was a slight exaggeration, we were suitably amazed by what can be achieved when someone puts his mind and some practical skill with electronics to solving a problem.

Doug retired from full time flying in 1988 and in 1992 someone gave him an early version of Flight Simulator to complement his interest in computers. Doug soon realised that the level of

realism could be improved by enclosing the monitor. Eight years and many upgrades later Doug was able to treat us to a fantastic flight from Edinburgh to Gatwick in a 737 and the highlight of the day was a trip in a Spitfire under Tower Bridge! Doug's cockpit doesn't move, but you become so immersed in it, courtesy of the layout and the lighting, that emerging from a spin in the Spitfire leaves your legs shaky and brings forth more than a few beads of perspiration on the brow.

Doug's cockpit is housed in a home built wooden wedge shaped 'box', with a door at the back. The fittings inside include the control column from a Vampire and the seat from a Jet Provost. The Vampire

All the switches work, even down to the two Spitfire starter buttons, although don't even think about re-wiring it!

column has been simply converted for flight simulation by attaching a rather interesting Free Flight joystick to it. These sticks (no longer manufactured) work through a light sensitive resistor floating in a pool of dark liquid, all encased in the bottom of the stick. As the stick moves the liquid sloshes about, varying the light in the tiny chamber and, in turn, the voltages from the resistor. It performs the same function as the potentiometers in a normal stick, but without the moving parts. Doug will probably have to change to a more conventional setup soon, as he's running out of spares for these obsolete devices, but it's certainly very fluid (if you'll pardon the pun) and tensioning bands attached to the Vampire column give just the right feel.

The control panel itself doesn't resemble any particular aircraft, although the engine-starter buttons are genuine Spitfire items and the undercarriage retracts courtesy of a Canberra. However, knobs and switches perform all the keystrokes and you soon get the feeling of operating a piece of machinery, rather than a PC. To duplicate all the keystrokes, Doug has hardwired a keyboard, situated outside the cockpit and whilst this is a laborious process (and a maintenance nightmare, he advises) it does the job brilliantly. Asymmetric throttle operation functions through a home built throttle quadrant and there is a full surround sound system to add to the realism.

The two PCs operating everything (the main PC is a 400MHz Pentium) run into a 20-inch monitor inside the cockpit with another monitor outside for the 'instructor'. From this exterior seat you can control all aspects of the flight, including simulated fires, engine failures, changes to

weather, in fact almost anything that might come your way whilst in the air. This really gives it the feel of a professional simulator and has been used by pilots to brush up on their 'simulator' techniques before they go for regular tests on the airline machines.

The main drawbacks with this particular cockpit are the difficulty of maintenance once everything is in place (remember, a 20-inch monitor isn't light) and the need for a forest of wires that are soldered into a keyboard. Plans for the future include a two-seat conversion and possibly a way to resolve the keystroke problem. Overall though, this is a remarkably good example of what you can achieve without resorting the vast expense of commercial components.

From abode to airliner in a few easy stages

There are a huge number of 'realistic' cockpits built by flight simulator enthusiasts the world over (take a look at www.simpits.org for some interesting ideas) and a lot of cash has been spent in achieving some amazing results. However, a trip in Kevin Saker's 757 was enough to convince us that it is possible to faithfully reproduce the cockpit of a modern airliner at modest cost. The images don't do justice to the sense of surprise you get as you open the bedroom door of a normal three-bedroomed house to be confronted by a complete 757 cockpit. First you do a double take – you can see the 'aircraft' but your hand is on the handle of a gloss painted door – how can this be? After a while, you adjust to the experience and once you sit in the seats (right, left or jump seat) it's hard to

imagine that you won't be soaring off to foreign climes in this airliner.

Kevin is no stranger to cockpit building and his previous incarnations include a Phantom that he 'dismantled' to make way for his current project. A quick look at any of the photographs of Kevin's 757 will tell you that he obviously has access to an aircraft scrap yard and some pretty sophisticated tools. However, you'd be wrong! An ex-professional model maker, Kevin has crafted virtually every part of his cockpit from Plasticard. This is a common product used by modellers and is essentially the stuff that model kits are made from, but in sheet form. Even the handgrips on the throttles are made using special putty (Milliput) and are indistinguishable from the real thing.

Virtually all the knobs and switches work as they should and are standard items obtained from a hobby electronics catalogue. To overcome the problem of connecting them to a keyboard, Kevin has used a very neat solution. Mounted under a cover on the 'fuselage' is a normal keyboard with an array of relays on the top. As each switch is closed it activates a relay above the relevant key and presses the key. It sounds complicated but works brilliantly. However, Kevin's next upgrade will be an Epic card (extended programmable input controller) from R & R Electronics. This ingenious device is installed in the PC and totally replaces the keyboard. Connections are made to any switches or controls you want to use and it can be programmed in a similar way to a joystick.

Kevin uses three networked PCs to drive his simulator and runs Flight Simulator 2000. The main PC is a Pentium III 550, with the others of far lower performance. The main PC takes care of the external view (and so needs to be pretty powerful

Is it a house? Is it a plane? When they say "local airline" round here they really do mean local

to keep those frame rates high) but the others run the flight displays and you can source some pretty reasonable machines second hand to take care of these functions.

A CTX Pro projection monitor mounted on the 'roof' of the cockpit provides the exterior view and another five normal monitors handle the flight displays, nav and engine displays for pilot and co-pilot. Projection monitors are expensive beasts (this is the most costly item in Kevin's cockpit) but you can get good effects with a normal monitor and a Fresnel lens. This is essentially a magnifying screen that fits over a conventional monitor and increases the size of the display for about £100. The various displays are controlled with Project Magenta software and obviously the choice of a 'glass' cockpit like that in the 757 means you can get very close to duplicating the real thing. However, Kevin also uses Chuck Dome's gauge maps and alloy cut out masks over the monitors and this is one way of getting traditional analogue gauges onto a screen. We don't recommend trying to convert normal mechanical gauges to operate from your PC! It's possible in theory (the large, full motion machines do it) but beyond the scope of most enthusiasts.

You get a fantastic view from up here.....

The yokes are exact copies of the real thing made with resin in Kevin's own moulds and using some normal plastic pipe for the column. The pedals are connected to a bar and along with yokes, they use a system of cables and pulleys to connect to potentiometers and perform their functions. Both pilot and co-pilot controls

work faultlessly and it is amazing to see the co-pilot's controls function in unison as you fly from the left hand seat. Talking of seats, these are old car seats that are pretty close to the cloth pattern and shape of the real thing. They certainly feel right and again, add to the sense of sitting in a real cockpit.

Yokes, seats, pedals, switches... they all work as well as they look

No, not plundered from Bob's Used Boeings, but all made by hand from modelling plastics

Pilot and co-pilot fly together – everything is duplicated, just like the real thing

However, Kevin's piece de resistance comes when you're flying. As you move down the runway everything goes on as it would in a normal aircraft. The engine sound is superb (SoundBlaster Live and surround speakers) and the runway disappears underneath as you look out of the canopy. Then, the nose rises for take off and the aircraft shudders as it leaves terra firma… hang on – we're in a three bedroom house, how can this be? The answer is a very neat solution to the problem of simulating motion without million-dollar hydraulics. Underneath each seat Kevin has mounted an electric

motor (12v car heater fan motors are recommended – a couple of pounds from your local scrap yard) and attached to the spindle is an eccentric weight. A simple sound-to-light unit is wired in to the speakers and set to activate the 'lights' at low frequencies. Whenever the aircraft makes a deep noise (like the bump of takeoff and landing, or the flaps extending) the sound-to-light activates and instead of flashing a bulb it spins the motors. The seats shudder and you have the sensation of motion for a very modest outlay.

Kevin's expertise is being put to good use later this year when he joins fellow 757 cockpit owner (yes, there's another one!) Daren Knightsbridge as they fly round the world for Children in Need during World Flight 2000. Kevin built the yokes and throttles for the WF2000 simulator as well as joining the team as a pilot. The fact that there are two such cockpits around should be enough to demonstrate that it isn't quite as difficult as it looks to achieve some amazing results and you don't need to be a millionaire, either. ■

Dermot Stapleton

USEFUL CONTACTS AND SOME DO'S & DON'TS

Go on, clear out that coal shed or tidy the loft and practice your DIY skills. With some MDF, a trip to the local scrap yard (mind that dog!) and a bit of spare time, you could soon have your very own cockpit to fly from.

Project Magenta -
All the software you'll ever need for glass cockpits and multi monitors.
www.schiratti.com

CSI Cockpit Simulations -
EPIC (extended programmable input controller) cards, glass cockpits and loads more for the home cockpit builder
http://em.ca~cockpits/main

RC Simulations -
contact Bob Sidwick for Fresnel lenses, sticks, yokes, pedals, whole Jumbo Jet chassis (well, almost) and pretty much anything else for flight simulation.
www.rcsimulations.com

Maplin -
Not the holiday camp, but every conceivable switch, knob, contact or button you should ever need.
www.maplin.co.uk

Kevin Saker - talks you through the whole process of how he built his cockpit at http://www.flightsim.com/cgi/kds?$=main/howto/kevssim.htm

Our intrepid cockpit builders are all happy to hear from PC Pilot readers by e-mail, to discuss their creations. When he isn't flying round the world Kevin Saker is at kevin.saker@virgin.net and Doug Atkins can be found

either under Tower Bridge in a Spitfire or doug@gremlin.prestel.co.uk.

Enquiries about Tony Jones' 'Flying Desk' (our name, not his, but it sounds catchy!) to: Mr. T. Jones, 4 Station Road, Little Bytham, Grantham, Lincs, NG33 4RA (that's in the UK). Tel: 01780 411029. Email: tonywjones@cwcom.net

DO:
• Your homework – there's plenty of information on the net and in books to help you with cockpit layouts.
• Decide whether you want a specific aircraft or something that can be a bit adaptable.
• Build a cockpit for the flying you enjoy - remember, flying a Jumbo, accurate to the last detail, from London to Birmingham defeats the object if you're attempting total realism.

DON'T:
• Forget that cockpit building is for enjoyment and satisfaction, not to put a millstone round your neck!
• Dive in – plan the project before you start ripping down walls.
• Attempt to use real aircraft parts unless you know what you're doing – aircraft switches, dials and levers work with extremely complex electro mechanical systems. It's usually easier to make a normal switch look like the one in an aircraft than it is to make a real aircraft switch operate a keystroke. As a general rule, the older the aircraft the easier the parts will be to adapt, if you really must follow this route.

Multi Monitors for Flight Simulation
When one monitor isn't enough!

If the article about cockpit building has fired your interest in improving the realism of your simulated flying, or you fancy a wider view, read on… Katy Pluta follows up her earlier feature on multi monitors, with an answer to those frame rate problems using a network.

In our article in Issue 4 we showed you a simple method of using multiple-monitors with Flight Simulator. We'll now take a closer look at another solution that also allows for several displays, but this time giving a decent performance for simultaneous external scenery views during flight. We discovered previously that adding several displays on one PC for the external views in Flight Simulator 2000 brings the performance to an unacceptable level, with very low frame rates. To keep a smooth display on a front view as well as on left forward and right forward view, you need a small home network with a PC dedicated to each view and some rather neat freeware called Wideview from Luciano Napolitano.

The dedicated machines do not need to be fully equipped, although a medium range processor like a Celeron 500 and 128 Mb of RAM will give perfectly acceptable performance with Flight Simulator 2000 and you can dispense with a lot of ancillary components like sound cards, as the card in the main computer will provide all these. On our main PC we used a G400 Matrox card plugged into a 24-inch TV for a large front view of the scenery and panel, with another 17-inch monitor set up outside the cockpit. In addition, two other computers were networked in to provide a left-forward and right-forward views, via two more 17-inch monitors.

Network interface cards in each machine were linked to an external hub using the standard cables to provide the hardware connection between the different computers. Next, the network was set up within Windows 98/2000 and this required the installation of an IPX/SPX protocol on every machine. Finally, we installed Wideview as per the author's instructions and we were ready for some rather more 'immersed' flying.

It all sounds too easy, so let's take a closer look at the hardware part. There are now home-network kits available at affordable prices, both traditional or USB. Although the latter is easier to set up via the Plug'n Play feature, we preferred to use 10Mbit PCI network cards and a 10Mbit hub as the bandwidth and overall reliability is better. You need a network card, or a motherboard with networking abilities included, for each machine to be able to connect on the network. Then, each computer is hooked on the hub using 10Base-T cables. We recommend the inclusion of a hub rather than a simpler network setting that links every card together via co-axial cables. You should get a six or eight port hub because it is easier to expand the network for further use later. A small 'virtual flying network' could very well be expanded into a home network, sharing internet access and devices such as printers and scanners, for your laptop or even the rest of the family!

The installation of the software network components in Windows is quite simple. After installing the network card and its drivers, add the IPX/SPX protocol - this is the language used for the computers to communicate with Wideview, which itself is very easy to set up. It comes with complete documentation and ready-to-use initialisation files to copy over in the Flight

Simulator 2000 folders on each computer. One computer, known as the 'server', will control the others (the 'clients') and while you fly on the server, Wideview will pilot Flight Simulator on the clients with the same aircraft, in the same scenery and with the same weather!

To work properly, the Flight Simulator installation needs to be the same on all computers, so be ready to duplicate the aircraft and add-on sceneries for each machine. The added dimension provided by a scrolling scenery on three sides is well worth the time and resources spent. Watching an airport and control tower scrolling from the front, then to your left, finally disappearing to side as you roll down the runway, greatly enhances the realism! ■

Katy Pluta

A SHORT GLOSSARY AND WHERE TO GET WIDEVIEW

BANDWIDTH: The amount of data per second that can be sent through a network

HUB: provides the 'traffic control centre' that directs information through your home network, connecting the computers together to form an ethernet network

USB: Universal Serial Bus, a low-speed external interface for communication between computers and peripherals

Wideview web site:
http://wideview.00server.com/

THE HARDWARE WE USED

FS2000 Master
Motherboard: Asus P2B
Processor: PIII 733
Memory: 192 Mb SDRAM
Video: Matrox G400
Sound: Creative SBLive! PCI
Operating System: Windows 98 SE
Network card: 3Com Etherlink PCI

Left, front and right views of Ron Ackerley's 'Kjelgaards Cabin, Alaska' scenery for FS2000, using his excellent Piper Super Cub 180 'Cree Lake Upland Edition' aircraft (http://www.fsadventure.com)

FS2000 Left View and Right View computers
Motherboard: Intel 810
Processor: Celeron 533
Memory: 128 Mb SDRAM
Operating System: Windows 98 SE
Network and video chip sets embedded in the motherboard

Flying above the 'Beaver Lodge, Alaska' bush scenery from Ron Ackerley – left-forward, front and right-forward views in the same Piper Super Cub

FLIGHT PLANNING
The best laid plans...

You wake up in the morning and look out of the window to see a glorious 'gin clear' sky. It's a perfect day for flying so you drive to the aerodrome, jump into your plane and head for the sky. After buzzing your favourite beauty spots you return home for landing, keeping your speed as high as possible until the last second. Lowering the undercarriage and flaps all in one go at about 300 feet, you slow to just the right speed at the threshold for a perfect landing.

Sadly, this is a lot easier to accomplish on a PC than in real life. Modern flight simulation is increasingly realistic but if you want to genuinely reflect reality, you will have to do more than just switch on and fly. For a real flight there is essential pre-flight preparation to do on the ground before you even walk out to the plane.

Checking the met

A typical flight in a light aircraft will begin on the ground well before take off. No doubt you would have a particular route in mind and so the first check is to assess the weather forecast along your proposed route. The 'met' comes in a variety of forms and for us the first look takes place before we leave home with a quick surf on the Internet for the synoptic chart and the TAF (terminal area forecast). If flying looks hopeful, it's off to the airport where the official met is checked.

An aviation synoptic chart is very similar to the weather map you will see on the TV, showing pressures, isobars and fronts. However the aviation version also has a small graph in one corner, which can be used to convert the distance between the isobars into wind-speed. Wind direction is easy to find, as the wind blows parallel to the isobars at most light aviation altitudes - but which way? This is found using Buys-Ballot's law, which loosely translated states that winds blow clockwise around a low pressure and anti-clockwise around a high pressure. This rotation is in the opposite direction in the Southern Hemisphere. As a quick check on the weather, in general terms there will be most rain and lowest cloud around the fronts or in troughs of low pressure. The weather conditions in high pressures

Tools of the trade – typical flight planning equipment

regions will not change much, although there will usually be steadily increasing haze. If the weather is good it will stay good and if it's horrid, then stay on the ground.

TAFs

TAFs are not Welsh pilots, but terminal airport forecasts and they show the forecast in a concise coded form that can be seen on several Internet sites. The format can vary a little, but a typical TAF would be:

```
EGNX 15/07-16Z    26013KT
9999  SCT025  BECMG  1013
28013KT TEMPO 1214 5000 SHRA
BKN015=
```

This means that for East Midlands Airport (EGNX) on 15th day of the current month between 07:00 and 16:00 Zulu (GMT), the wind will be 13 knots from about the west and the visibility will be 10 kilometres or greater. There will be scattered clouds at 2,500 feet. Between 10:00 and 13:00 the wind will veer from 260 degrees to 280 degrees. Between 12:00 and 14:00 the visibility will drop to 5,000 metres in rain with broken cloud at

15,00 feet. This shorthand looks tricky to use but is actually easier and quicker to read once you get used to it.

METFORM 215

The Met Office produce a brilliant forecast document called the Metform 215. It shows a map of the British Isles split into a number of zones and gives the forecast for each one. The zones are positioned depending on the weather, so if it's cloudy in the west and clear in the east there would probably be just two zones. The weather for each zone is again written in shorthand and there is often extra information about smaller regions within them.

An example zone could be the British Isles with the exception of the tip of Scotland and the extreme South coast and typical forecast information would look something like this:

```
ZONE 1 GEN   7KM    RA
5-7/8STSC    2000/5000

ISOL E 1000M TS/HAIL
7/8CB     800/24000
```

This means that the general forecast for zone 1 is 7 kilometres visibility in rain
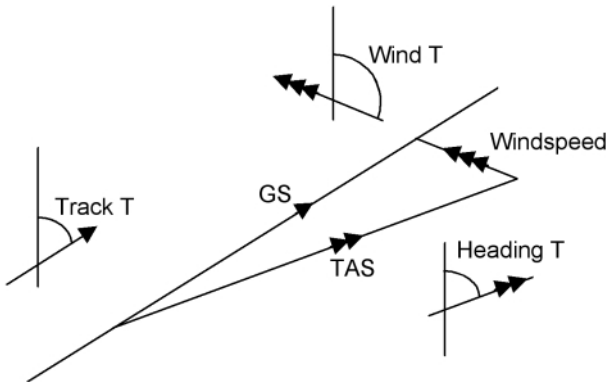

Figure 1: how vector calculations are made

with 5 to 7 oktas stratus and stratocumulus cloud between 2,000 feet and 5,000 feet, but isolated in the east the visibility will drop to 1,000 metres in thunderstorms with hail and cumulonimbus clouds, base 800, tops 24,000 feet.

Weight and balance

There are a few other things that you would check at this stage including NOTAMS (notices to airmen), which list things you should really know about before you go flying, such as air-shows, beacons out of service and frequency changes.

You would also check the weight and balance of the aircraft you are about to fly. This means that you would not only make sure that the plane was light enough to fly safely, but also that the centre of gravity of the plane, the fuel, its occupants and any cargo is not too far forward or back. The effect of the centre of gravity being outside its limits can range from high stick forces that can't be trimmed out, to unrecoverable stalls.

Planning the route

So we now believe it's safe to go flying, let's plan it!

The shortest distance to your destination will be a straight line, so that's not a bad starting point for your flight planning. Some short flights will indeed be possible as a straight line between airports, but it is unusual. On most flights four things make life more complicated than that.

Firstly there are a number of prescribed routes that have to be flown exactly if you want to use them, and the most obvious of these are airways. Generally speaking, in the UK these define the routes that are taken by commercial flights and everyone else keeps out. There are also entry and exit lanes for some airports that specify the only ways you are permitted to fly through their airspace.

Secondly, a significant proportion of the airspace in the British Isles is restricted in one way or another. There are the various classes of controlled airspace (A to G), MATZs (military air traffic zones), Prohibited, Restricted and Danger Areas.

Thirdly, the geography of the route is very important. For example, you may decide that a route over flat farmland is better than over mountains or the sea, as you would have many more options if the weather is worse than predicted or if the engine decides to retire early. The cloud base may restrict the maximum height you are prepared to fly. It is generally recommended that the flight is always 1,000 feet higher than any terrain or object within 5 miles of the track. There are other legal restrictions such as flying at least 2,000 feet above any aerodrome,

Which hill was the turning point?

Typical visibility into the sun on a hazy day

PC Pilot Flight Log

WPT	IAS	RAS	TAS	WV	WD-T	TMP	S-ALT	ALT	P-ALT	TRK-T	HDG-T	VAR-W	HDG-M	GS	DIST	TIME
Bournemouth	120	120	123	25	080	12	1000	1500	1500	351	003	4	007	120	6	3
Verwood	120	120	127	25	080	8	1900	3500	3500	297	304	4	308	146	12	5
Compton Abbas	120	120	127	25	080	8	2000	3500	3500	354	005	4	009	122	21	10
Trowbridge	120	120	127	25	080	8	1800	3500	3500	304	312	5	317	143	7	3
Bath	120	120	125	25	080	10	2100	2500	2500	272	274	5	279	149	14	6
Bristol																
													Totals	60	27

Note that extra columns have been included above to show how the calculation is done.

Fill in the secton below as you fly the route using the data above, making adjustments if necessary

ATA	WPT	HDG-M	ALT	ETA
	Bournemouth			
	Verwood			
	Compton Abbas			
	1/2			
	Trowbridge			
	Bath			
	Bristol			

Bournemouth GND 121.7 TOW 125.6 APP 119.62
Compton Information / Radio 122.70
Bristol ATIS 126.02 APP 128.55 TOW 133.85
FIS 124.75
Yeovilton CMATZ/LARS 127.35

Fuel Consumption (US gph)	15
Fuel Reserves (mins)	75
Fuel Required (US gall)	25.5

Not to be used for actual flights

Key
WPT- Waypoint
IAS - Indicated Air Speed
RAS - Rectified Air Speed
TAS - True Air Speed
WV - Wind Speed
WD-T - Wind Direction True
TMP - Temperature
S-ALT - Safety Altitude
ALT - Altitude to be flown
P-ALT - Pressure Altitiude
TRK-T - Track True
HDG-T - Heading True
HDG-M - Heading Magnetic
GS - Ground Speed
VAR-W - Magnetic Variation West
DIST - Distance to next waypoint
TIME - Time in seconds
ATA - Actual Time of Arrival
ETA - Estimated Time of Arrival

Figure 2: a sample log for our flight. You'll find it in Excel format on the cover CD

(unless you have their permission), 1,500 feet above towns and not flying within 3,000 feet in any direction from a gathering of 1,000 or more people in the open air.

Finally your route is likely to take into account navigational fixes. A prime objective in flying is not to get lost. Therefore it is sensible to choose a route that goes between things that are easy to identify and not too far apart. These will often be radio beacons, but if you are flying a plane without the necessary instruments, all fixes have to be visual. They are likely to include towns, lakes, hills and railway lines. The key is to choose things that can be positively identified and are generally unique in that

area. Looking for a particular hill in mid-Wales is unlikely to be successful, but choosing Rutland Water near Cottesmore is about as good as it gets.

Start your planning

Having decided on a route, you will now have to fill in the other details of your plan. You need to determine the heading to be flown for each leg and the time taken to fly that leg. It is also absolutely essential that you calculate how much fuel you will need and that you have at least one 'alternate' aerodrome to land at if there is a problem at your destination. The technique for planning your flight is pretty standard and even the smart software now available will be doing

similar calculations. Many of the calculations have traditionally been done using a 'Navigation Computer', which ironically has no electronic components at all. It is really just a customised circular slide-rule with a wind drift tool on the back. Each leg of the flight is calculated the same way and this is how it is done:

Draw the straight line on your map between the two waypoints and measure the direction and the distance between them. The direction is known as the true track and 'true' means that it is based on true north. Fix the altitude for the leg, which ideally would be the same altitude as all the other legs, but this is not always possible.

True air speeds and headings

Decide what speed you would like to fly at. This is the speed shown on your instrument panel and is called, not surprisingly, the IAS (indicated air speed). No instrument is perfect and putting it in an aeroplane will introduce further errors. There will normally be a correction table in the aircraft manuals and this is used to convert IAS into RAS (rectified air speed). The higher you fly, the thinner the air is and the faster the plane will be flying for a given IAS. TAS (true air speed) is calculated from the RAS by correcting for altitude, temperature and pressure, or in other words air density. This is a sophisticated calculation made easy by the navigation computer, but a good approximation can be made by adding 2% per 1,000 feet altitude.

Now comes the tricky part. Take the TAS, true track and the forecast wind speed and direction (which come from yet another Met chart called Form 214) and use these to calculate the heading to steer and the groundspeed along the track. This is a sophisticated vector calculation and is also simplified by the navigation computer. Figure 1 shows the concept and those who
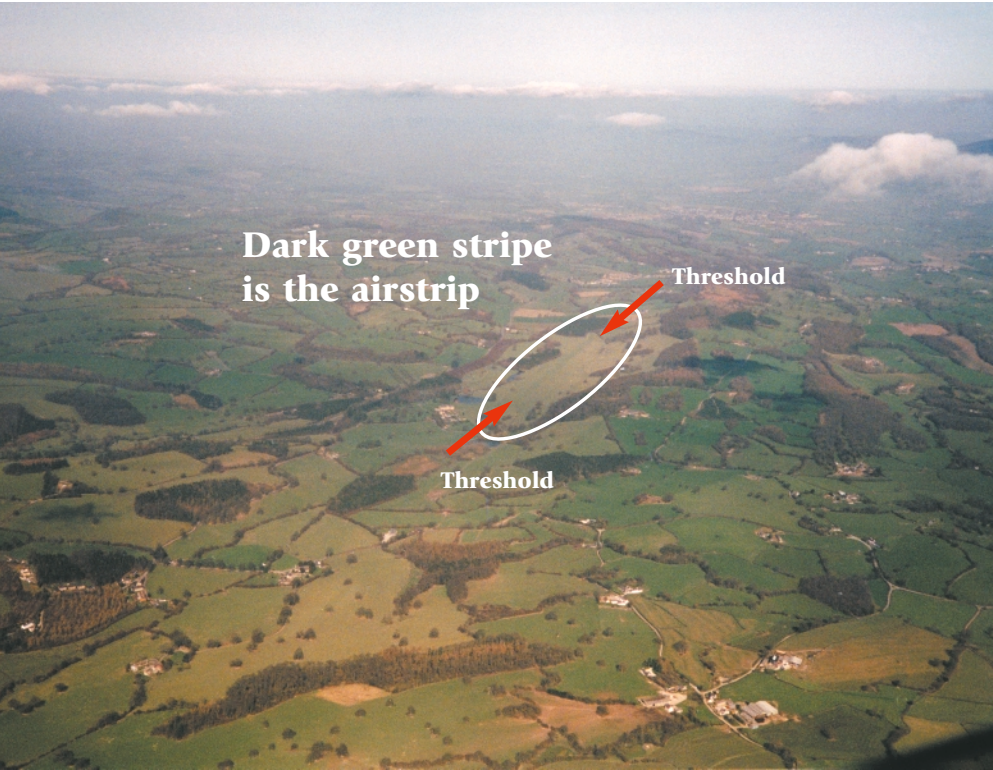
If you don't know where it is, you'll never find it!

Dark green stripe is the airstrip
Threshold
Threshold

love mathematics can easily do the calculation using the sine rule.

The leg distance divided by the ground speed easily gives the time for the leg, but there is still one more step to find the required heading to steer. So far we have been dealing with true directions, but true north and magnetic north are different. The difference is known as the magnetic variation and is currently about 4° west in the south of England. "west is best and east is least" is a handy little rhyme to remember to add the variation to our true heading to get our magnetic heading.

Final checks and out to the aircraft

Add up all the leg times together with a further 75 minutes to cover reserves and such things as taxiing, take off and climb. Multiply this by the fuel consumption and you will know the minimum fuel required for the flight.

As a final step it is crucial to do a 'sanity check' on all of your flight planning results, especially as your life could depend on your plan being correct. This is a critical look at your plan to make sure it is sensible. Check that your headings are broadly in the right direction and that your corrections for wind drift are to the correct side etc. It is all too easy to be 180 degrees out and calculate a heading of 165 to fly from London to Scotland.

All of this seems very involved, but with practice it doesn't take that long for most flights and you must be properly prepared. You can then walk out to the plane, carry out the pre-flight checks and ensure it's airworthy. Once that's done, book out with the airport control and take to the skies.

Much of this flight planning process is recorded on a flight log, which is then used throughout the flight. It is used at every waypoint to determine how to fly the next leg. It is also there to monitor progress and to know when to look for particular navigation features. An example flight log is shown in Figure 2 which you can use with your flight simulator to see how it really works. It shows the planning and log for a VFR flight from Bournemouth to Bristol. It should be flown in five mile visibility with wind at 080 and 25 knots. Most importantly don't use any radio beacons, don't use the autopilot and never press pause. Fly accurately to the plan and rely on your mark two eyeball alone, day or night and Bristol will pop out of the haze right on time. If you plan all your flights in this way and fly in this lower visibility, you will get terrific satisfaction from planning well, flying accurately and

Good navigation is essential, even for large airports

Airport at 7 miles

WE HAVE A CUNNING PLAN

As an interesting exercise we've included all the relevant files for anyone who wants to attempt our example flight using Flight Simulator 2000. On the cover CD with this issue you'll find a folder called 'Flight Planning'. Open this up and inside it are two other folders called FLT files and WX files. To follow the flight log shown in Figure 2, open up the folders and place these *.FLT and *.WX files in your Flight Simulator 2000/Pilots folder.

Then use them by selecting the menu option: **Flight -> Select Flight**

You will see the following places, which are your turning points along the track:

Bournemouth - sets everything up for the start of your flight

Verwood

Compton

Trowbridge

Bath

Bristol

Select any one to go there

You'll also find '**Bristol 2**' - this is an alternative and awkward position for you to be in downwind. Landing it is simple if you make the right decisions and take the right actions. If you take the wrong actions, it's still possible but much harder.

Try both and enjoy a well planned flight!

TRANSAIR PILOT SHOP

Order line: 01273 466000

www.transair.co.uk

Building your own aircraft with Design Studio Pro

Where does that piece go…?

As our original review of Design Studio from Abacus in Issue 5 has already shown, this is a brilliant piece of software that offers advanced facilities and tools to rival those found in the world of professional CAD (Computer Aided Design).

When we took our first look at this product, we concentrated mainly on its aptitude as a scenery design tool. But Design Studio is capable of much more than simply creating static buildings and architectural enhancements to the Flight Simulator world. It also offers quite sophisticated aircraft design tools that allow those of us not so technically proficient to create our own aircraft. For those that struggle with the more complex methods of airframe design, it provides an industry standard interface that is a real improvement on currently available products.

We decided that further investigation was called for, to outline the steps needed to build your own (hopefully) flyable aircraft, for use in Flight Simulator 2000.

Project Data

Unless you have a specific project in mind, where perhaps you've been dreaming about that new aircraft design but have never had either the mean, or the opportunity to build, you'll want to begin by gathering some data. This usually takes the form of drawings, schematics or photographs as reference material for your project. There are a number of places to get this information, either libraries, aircraft manufacturers, or any one of the many web sites dedicated to aircraft design. We found the aircraft design forum on flightsim.com was a great source of advice and general information on the subject and a line drawing for our project was sourced from this site.

The aircraft we modelled is based (loosely) on an NZ Aerospace Airtrainer designated the CT-4, which was built in 1959 by NZ Aerospace Industries of Hamilton, New Zealand. It was of all-metal construction and powered by a Rolls Royce Continental flat six engine, with constant speed propeller.

Having decided on a subject, the first thing to do is to load the background images you'll use as reference for the size and shape of the aircraft. If you want to

achieve an accurate scale within Flight Simulator, you also need to have the dimensions of the original aircraft. Then, physically setting the scale is simply a matter of clicking the mouse at the extremities of the image and typing in the actual length you've just defined. This sequence is repeated for each of the three elevations, top, side and front and then we can start to build…

Our project finally on the runway ready to roll

Into Production

Like any building project, there are numerous ways to achieve the same result. Some are easier than others but none of them are necessarily 'the right way'. It falls on the user to experiment with the tools available and decide which is best for them.

The first section we tackled was the fuselage, which was created using one of the primitives, in this case a tube roughly the length of the aircraft. This was then shaped to match the backdrop profile by using the cross section mode and finally tweaked to get the shape we needed, using point edit mode. The facility to zoom and expand any view to full screen helps to get at the area you want to work on. Incidentally, another method of making this part would be to draw templates that match the cross section shape you want and extrude them in one operation.

Once you're happy with the fuselage shape you need to create the windows, or in our case the bubble canopy. This is one of the difficult parts of aircraft design, because creating transparent sections can cause all sorts of problems. The most common being that the fuselage behind the transparent windows disappears, due to the way 3D models are drawn in the Flight Simulator world. The relatively easy answer is to copy the whole fuselage (minus the windows you've already removed from the main section) and reverse (flip) its surface normals. Put simply, this means you turn it inside out, so that when you look through the window into the fuselage you see the reversed surface… does that make sense? The main thing is that it works and we can move on.

In order to make the windows you need to change to polygon mode and define the area that will eventually be the window using the mouse selection tool. This is then split from the main fuselage and coloured with a transparent shade from the current object properties dialogue. The easiest method of handling the fuselage flipping we mentioned earlier is to save the windows as separate parts, carry out the copy and flip operation, then reload the windows back into position. This is quite straightforward because the parts always load back exactly where they were saved. As long as you haven't moved anything they will always fit perfectly.

If you're unfamiliar with X,Y,Z coordinate system, then the 3D interface will take some getting used to. It's not the same as working in 2D, where you can slide objects around the screen and always have a good idea where you are. In 3D things can get a little tricky. For example, what appears in one view to be exactly on top of a particular object, can in fact be miles away in another. If you imagine you're looking at the front of a fuselage and you want to tweak the point where the prop fits, selecting the actual point you want to work with is difficult, because you have no depth perception. The point you select could in fact be at the back of the fuselage, not the front. The answer to this is to always work with the appropriate view and refer to the solid 3D view in order to verify what you're doing.

The Extremities

When the fuselage is complete we come to the wings, rudder and elevators. The authors have thoughtfully provided a dedicated dialogue for creating these that reduces the task to simply selecting the profile template and typing in a few parameters. That's all there is to it… The program comes with a few templates that can easily be adapted for most aerofoils, or you can use the point edit mode and

The stages of building our aircraft
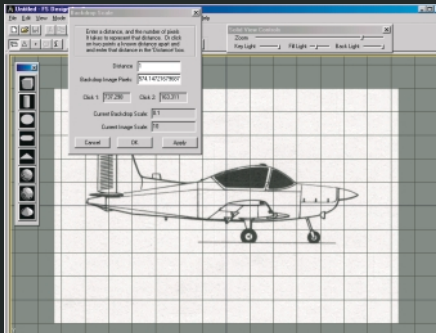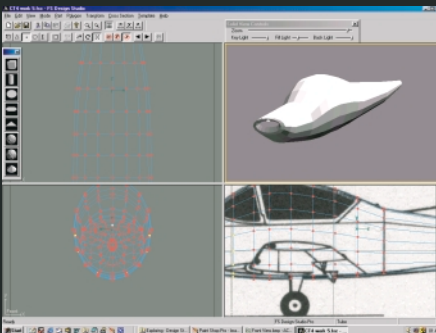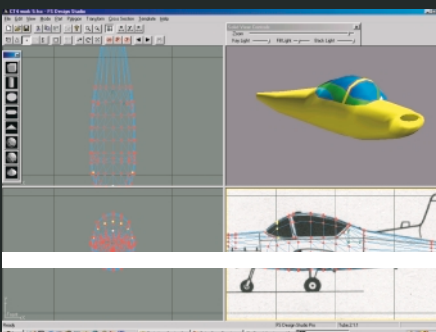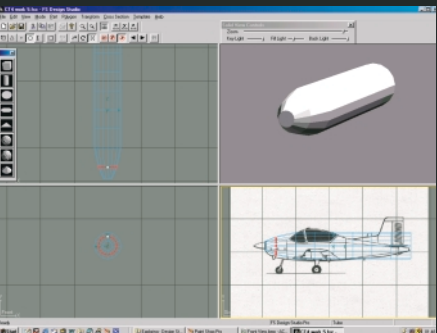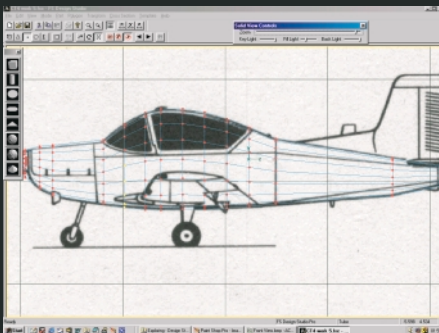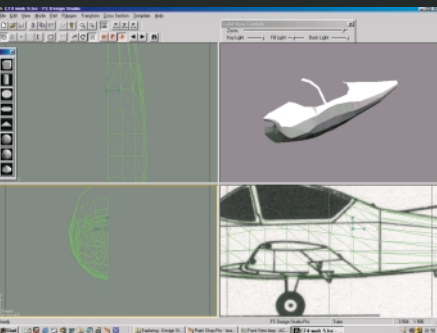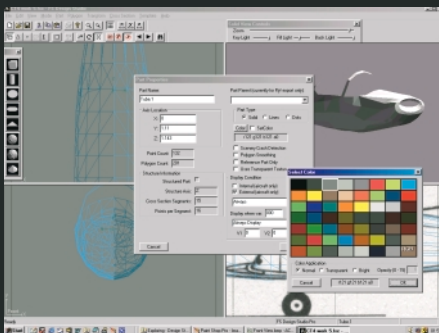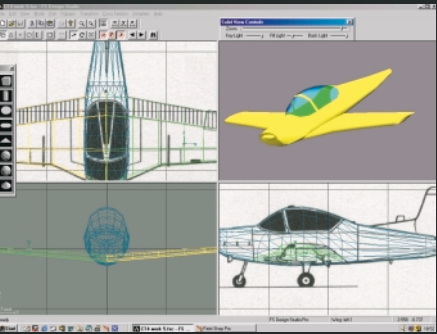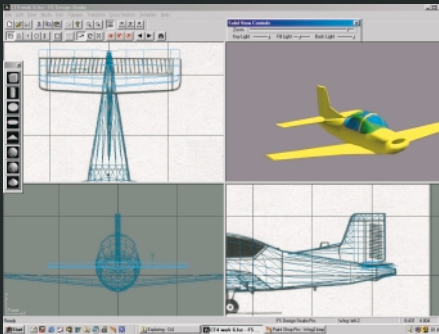
create exactly what you need from scratch. We chose the former option, but if the wing shape and structure doesn't fit your profile, then the point edit mode can be used to stretch and squeeze it into shape. There are three constraint buttons that lock each of the three axes to help you work in the correct plane. For example, if you had a square that you wanted to elongate into a rectangular shape, you would lock two of the axis and scale or stretch the third. This ensures that you can only move in one direction.

Moving from the main airframe we come to the undercarriage, which on this

aircraft is a typical fixed tricycle arrangement, neatly avoiding the need for animated legs and folding doors (you knew there was a reason for this choice of aircraft), although the facility is provided if you want to use it. Design Studio can interface with Abacus' Aircraft Animator and automatically animate many common parts- you only need to flag the part from the object properties dialogue and Animator will add the appropriate animation.

Making sub assemblies is really a matter of breaking the object you're trying to model into workable pieces, so a wheel

consists of a hub and a tyre. How detailed you make each part is up to you, although you should bear in mind that more detail means larger files, which can have an adverse affect of the performance of Flight Simulator.

The best way to depict detail is to create textures that are detailed. Rather than put hundreds of rivets on a wing you paint them on the texture. You can use practically any paint program to create textures, although we had some sort of inconsistency between Paint Shop Pro and Design Studio, which didn't seem to like the

STAGE 4 — Making the undercarriage & other appendages

One

Two

Three

Four
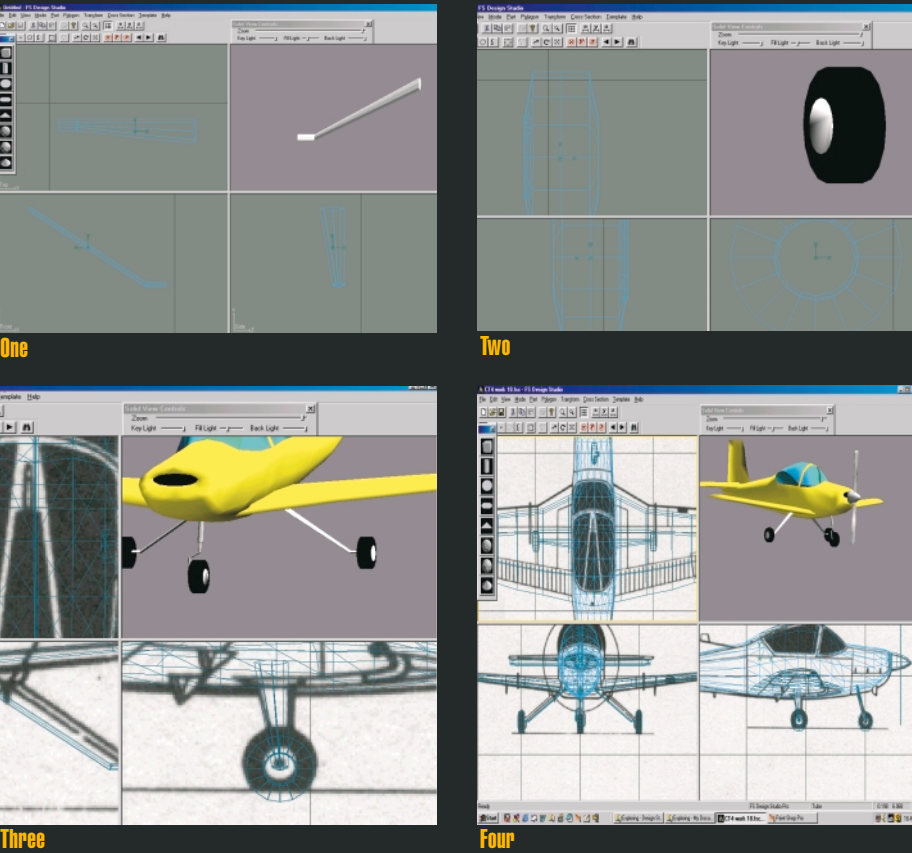
It actually flies!

.bmp files it created. However Micrografx Picture Publisher worked just fine.

Design Studio has a useful template feature for creating your own textures, which is indispensable when you're working with complex shapes like fuselages. It creates a blank bitmap that contains the outline shape ready for you to paint. You simply select the part you want a template for, go to the part menu and click on 'make template'. Applying the finished texture is just as easy - you right click with the object selected and choose textures from the pop up menu. The texture dialogue allows you to apply textures to any of the six faces, or wrap the texture around it in the case of tubes and spheres, using the X,Y and Z coordinates.

The final stage is to save your project as an aircraft .mdl file so that Flight Simulator will recognise and display it for you to fly. Ideally, you should use the inbuilt flight dynamics editor first to create an accurate .air file for the model you've created. However, this is not for the faint hearted, or for someone without the relevant data. A far easier method is to adapt one of the original .air files that come with the Flight Simulator 2000 aircraft, which is precisely what Design Studio offers when you select the create aircraft option. At this point all that's left to do is to copy any texture files you've created for your aircraft into the relevant Flight Simulator directory and hopefully go flying.

We aren't offering this as the definitive guide to aircraft design, but it's an interesting exercise to show you the method we used and that a 'personal' aircraft isn't beyond your capabilities when you have such a brilliant piece of software to help you. The model was built over a number of evenings with nothing like the attention to detail, or investment in time that the designers who constantly upload their freeware masterpieces on to the Internet obviously spend. Nonetheless, it was an interesting experience that we may return to at some later date. Look out for that fully animated Jumbo when we've a few months to spare! ■

Joe Lavery

STAGE 5 — Applying the Textures

One

Two

Three

Four
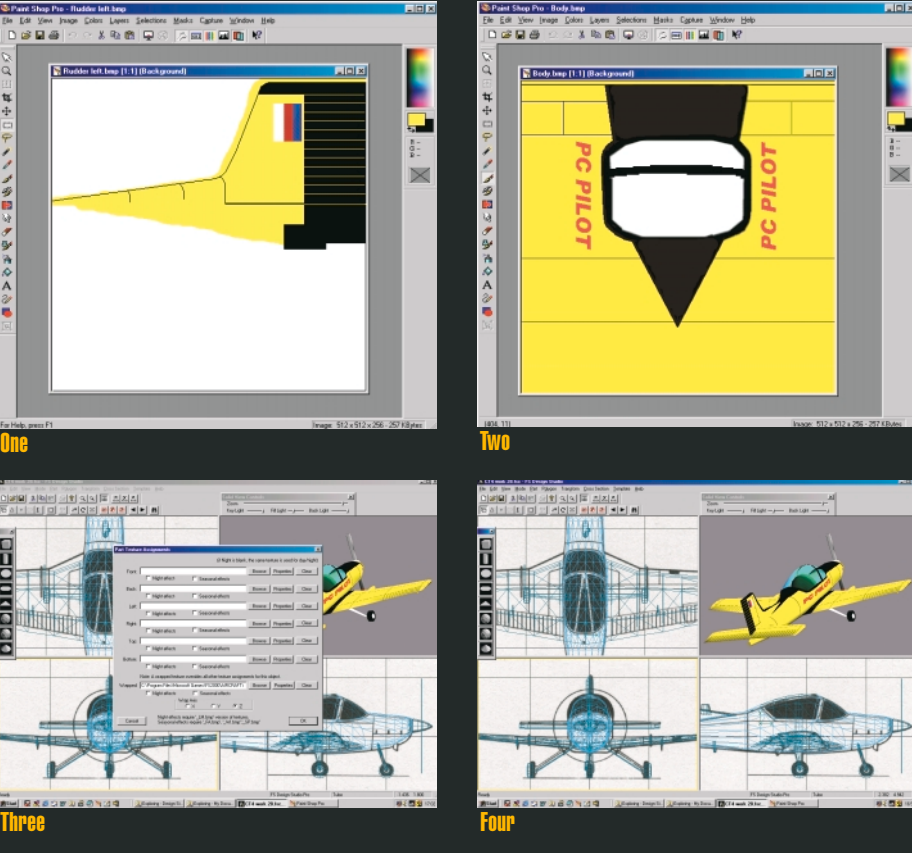
COMPETITION
YOU'VE GOT TO BE IN THEM TO WIN THEM!

First Prize – The fabulous ACS56 Surround System

HOW TO ENTER

All you have to do is correctly answer the following questions:

1) At what frequencies would you normally find deep noises like aircraft engines, bass notes and thunder?
   a) Below 100 Hz
   b) Below 1KHz
   c) Below 1MHz

2) If a speaker is described as being able to handle 100W RMS what does RMS stand for?
   a) Rather Modest Sound
   b) Root Mean Square
   c) Really Major Speaker

The competition is open to PC Pilot readers who live in the continents of Europe, Asia, The Americas, Australasia and Africa. Employees of PC Pilot, including layout, editorial and administrative staff as well as friends of The Crew are not permitted to enter!

You can send your answers by e-mail to comps@pcpilot.net or on a postcard/back of an envelope to:
Speaker Competition
PC Pilot Magazine
   PO Box 11
   St. Ives
   PE27 3GW
   United Kingdom

Please make sure you clearly state your full name, address and e-mail address (if you have one). The competition closes on 30th November. Entries received after that date will not be included. Prizes will be drawn at random from correct answers.

Well done to all those who entered 'The World's Smallest Competition' in Issue 6' You didn't see it? Take a close look at the small print in the bottom right hand corner of page nine. We picked three lucky winners out of the hat and they each get some recently reviewed software – first prize went to Mike Parker, whose joke is printed here. We had lots of other entries (many unprintable!) but the lucky runners up were Arnold Crompton, Trevor O'Reilly and Kerry Jones.

This issue we've got a much more serious offering up for grabs. Our good friends at Altec Lansing – www.alteclansing.com have generously donated their two excellent speaker systems that were reviewed in Issue 6. There's a pair of ACS33's (with sub-woofer) and the mighty ACS56 surround sound system. In case you missed the last issue we were very impressed with these superb speakers and as more products take advantage of surround sound technology, you'll need a good set of speakers like these to get the best from them. Both sets got a very impressive four stars from our review panel and we shall be very sorry to see these systems leave our offices. The layout team have had to dust off the gramophone and get winding.

Navigate to the 'How to Enter' box for details of acquiring (possibly) one of these fabulous prizes ■

JOKING APART

It's night over Las Vegas, information H (Hotel) is current and Mooney 33W is unfamiliar and talking to approach control -

Approach: "33W confirm you have Hotel."

33W: "Uhhhmm, we're flying into McCarren International. Uhhhmm, we don't have a hotel room yet."

Approach control was laughing too hard to respond. The next several calls went like this:

Approach: "United 5, descend to FL220."

United 5: "United 5 down to FL220; we don't have a hotel room either!"

(We had to ask an ATC to explain it!)

Second Prize – The ACS33 speakers with sub-woofer

TUMULT IN THE CLOUDS

Tactical display and enemy indicator in Combat Flight Simulator

Tactics in World War II combat simulators

Jan Zurakowski, later to become the famous Canadian test pilot of the Avro Arrow, tells of an encounter with a Messerschmitt while flying a Spitfire in the Battle of Britain:

"I was Blue 2 and … saw an Me-109 flying south at 14,000 feet. I approached from astern and as he turned, gave him a short burst from 100 yards. He half rolled and dived and flew low due south. I stayed on his tail and fired one burst at 140 yards and then the rest of my ammunition from very close. After my first attack he was smoking slightly and, later, heavily. The enemy pilot opened his hood as he crash-landed in the sea…." From Jet Adventure, by Geoffrey Norris.

So, how's it done? One minute you're the hunter cruising along blissfully; the next minute you're the hunted! What's your move? ACM (air combat manoeuvres) are

founded on flying skill and situational awareness and can be broken into five stages:

    Detection
    Closing
    The Attack
    Manoeuvreing
    Disengaging

The purpose of this article is to look at each stage and offer some pointers. We'll draw on the wisdom of those who have flown in real combat, and we'll make reference to three WWII simulations currently flown on the PC: Microsoft Combat Flight Simulator, Microprose European Air War, and Jane's WW2 Fighters.

Closing on a bandit in WW2 Fighters. Note the enemy view window upper right

Detection

"The first rule of all air combat is to see the opponent first. Like the hunter who stalks his prey and manoeuvres himself unnoticed into the most favourable position for the kill, the fighter in the opening of a dogfight must detect the opponent as early as possible in order to attain a superior position for the attack." Lt. General Adolf Galland, Luftwaffe, 103 victories

In roughly eighty percent of all kills made by fighter pilots in WWII the attacker never knew what hit him. How do you locate the enemy before he finds you? Each simulation has different methods

of locating the enemy and each allows some cheating.

Microsoft developed specific tools for Combat Flight Simulator to make it easy on the novice, the most prominent being a tactical display overlay that appears at the top left of your screen, with your aircraft at the centre. WW2 Fighters, on the other hand, makes use of an arrow indicator as well as a pop-up enemy window. Some pilots relish the Player to Target view lock, which allows you to fly your manoeuvre from an outside view. It's a cheat, but a great way to learn!

Since every simulation is different it's wise to develop a scan pattern that you can employ methodically to check the sky for aircraft. No less than once a minute you should go through a complete scan of the airspace around your aircraft. Start with front to right, then right to back. Then scan front to left, and left to back. Next scan up and back, and then begin to scan the areas that are blocked from easy viewing, since the enemy will use blind spots.

A manoeuvre called a forward slip is useful for detection at high altitudes, allowing you to bank your wings without changing your heading. The forward slip is a bank using ailerons with enough opposite rudder added to keep the aircraft from turning (a bit of up elevator may also be necessary).

Hunters on the prowl

Closing on the enemy in European Air War

Closing

"One must first overcome the inner schweinehund" Freiherr Manfred von Richtofen, Imperial German Air Force, 80 victories

It is here that you choose a manoeuvre to bring you within weapons range. If you have sufficient fuel and ammo and believe you can attain an advantage, you will choose to close on the enemy and verify the threat. Your strategy is

Closing on a bandit - this time the view is internal

determined by four factors: position, altitude, speed and surprise.

The first question with regard to advantage is your energy state and your estimation of the energy state of your target. Altitude plus speed equals potential energy. If you are in a position of advantage, then you are either faster or higher than the enemy, or both.

The next consideration is the force versus force equation. If you are one on one with superior energy and/or the advantage of surprise, you will likely choose to engage. If, however, you are one on two or two on three or more then your decision to engage must be made with greater caution.

Provided your energy state is superior to your opponent, all of these situations can still result in a successful attack. Other considerations enter the equation: your estimate of the ability of the enemy, individual aircraft advantages and most important of all, the potential of surprise.

Before closing on the enemy, note the bearing of friendly territory in relation to

where your fight will take place, as well as the direction of your mission objective. If you have to exit the fight, you don't want to waste time finding out which direction will get you to safety or help quickly. Once you decide to close, your current position relative to the enemy will decide your strategy.

Attack

"Good flying never killed an enemy yet." Major Edward 'Mick' Mannock VC, RFC – 73 victories

As soon as you reach weapons range, you are in the attack stage. Tactics and technique now become primary. Your goal is to stay on the offensive. Should you be forced into a defensive position, your manoeuvreing skills will be tested to the maximum.

The key considerations of this stage include your flying skill, your ability with guns, the particular aircraft you are flying,

The art of deflection shooting

the weapons you have mounted, and the mount and skill of your enemy.

Weapons and Employment

"The most important thing in fighting was shooting, next the various tactics in coming into a fight and last of all flying ability itself." Lt. Colonel WA 'Billy' Bishop, RFC - 72 Victories

In all World War II prop simulations, aircraft have guns and cannons. Some have just guns (the P-51B had four .50 calibre guns), some have cannon (the Me262A-1a had four 30 mm), and some have both (the Spitfire Mk XIV used four .303 calibre guns and two 20 mm cannon).

Other Sources for Combat Training

To our delight, the original Combat Flight Simulator offers a full set of narrated training missions! For those who are unfamiliar, Jane's pioneered this method with Longbow in 1997. In Combat Flight Simulator you select the manoeuvre you want to see, play the VCR tape, and then afterward can actually fly in the aircraft while the instructor guides you through each step of the manoeuvre!

European Air War lacks the instructor-guided lessons of Combat Flight Simulator, but comes complete with a detailed HTML training guide. Here is a quote from the section on Deflection Shooting:

"In general terms, there are two different types of firing solutions: tracking solutions and snapshots. Snapshots are less of a solution than a 'feel' for the way deflection shooting works. Snapshots have a lower percentage of success than tracking shots simply because you have less time to determine a firing solution before you actually pull the trigger.

Hopefully, you've already perused the section on energy management, so you have a basic understanding of the importance of energy management in a dogfight. Now, however, you must relate energy management to angle of attack. Proper deflection shooting requires that you match the angle of attack to a trajectory that places your bullets on target. Concurrently, however, you must come to understand that sacrificing energy to promote a target solution is not always the best tactical approach."
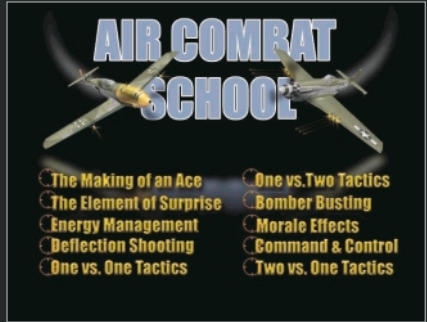
Training in European Air war

Combat Flight Simulator training

Making the kill in Combat Flight Simulator 2

Nose mounted guns fire straight in line with your aircraft. Wing mounted guns actually fire across your flight path, meeting at a point usually around 300 yards ahead of your aircraft (the convergence point).

Cannon and machine guns differ greatly in their killing power. While cannon are more effective for each hit, they fire much more slowly and have a shorter range. The pilot must know when to employ each weapon.

When the aircraft has both guns and cannon, you should use guns first unless you're within a hundred meters and undetected. Wait until the tracers from your guns have made contact or are just about to, and then hit the cannon button.

This 'firehose' method is like a stream of water from a hose. If you use a hose to wet an object that is at shoulder height or higher, watch the curving stream from the hose rise to meet the object. Making contact with tracers is quite similar. Start firing to place the aircraft in the stream and pull through so that you 'hose' the aircraft.

Spitfire takes on an FW-190

Using this method at around 100 metres you can get a hit about 50% of the time depending on the AOT (angle off the tail). When you get a cannon hit at this range you have about a 50% chance of putting the aircraft out of action. Many times you will actually take a wing or tail off.

Use your lift
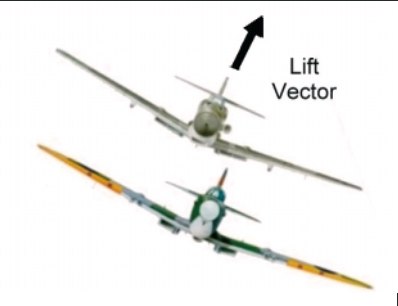
The lift vector

The lift vector always works at right angles to your wings (see diagram). You can use this to your advantage in a dogfight. First, roll in the direction of the enemy (canopy toward him). Next, switch to the UP view and stop rolling when the enemy is centred. At the same time, pull back on the stick, causing him to creep downward on your screen and toward the nose of your aircraft. Switch back to the front view when appropriate.

Using combat flaps increases lift and can reduce your turn radius. Like the lift vector technique, however, it can use up all your energy and make you a sitting duck. Used at the right time, it can gain you a victory.

Luftwaffe ace Hans Joachim Marseilles is the only pilot ever to have scored fifteen kills in a single day. He insisted on perfecting a deflection shot from any given angle, using different speeds. Standard procedure was to apply full throttle all the time. He refused to accept that standard procedure was always best and would often throttle back to achieve position. During combat he would also lower his flaps, in order to decrease the radius of a turn.

Sim pilots encounter enemies on every flight. In real war this wasn't the case. Even the very top German ace Erich Hartmann flew 1,400 missions for a total of only (ONLY!) 800 aerial battles. In those 800 battles he took down 352 aircraft. Hartmann makes a comment about aerial combat that is useful for the beginner:

"When you begin flying combat and you are a hundred metres from the enemy machine, you get jittery because you are too close to him. That is what you feel in the beginning. By experience you come to know that when you are a hundred metres from the other machine you are still too far away. The inexperienced pilot breaks away for fear of mid-air collision. The experienced pilot brings his machine in much closer . . . and when he fires, the other machine goes down."

Hartmann and Barkhorn

Note, however, that his modus operandi was not without risk. Eight of the sixteen times Hartmann was forced to land were a result of his flying into the debris of the Russian aircraft he had exploded at point-blank range! Hartmann was one of those rare pilots who were never wounded.

When we fly in simulated combat we tend to overstay our welcome because we know that death won't last. Similarly, we're less concerned when we get too close to an enemy aircraft. As a result, two things happen: 1) We sometimes collide or are hit by pieces of aircraft; 2) We are learning good techniques for staying on the enemy's tail!

Manoeuvring in WW2 Fighters. Pilot to target view

Not only is this the safest place, but once you are more than about 15% off the tail, you are engaged in deflection shooting. The higher your angle of the tail, the less likely that you will score a hit. Keep the AOT to a minimum.

Air Combat Manoeuvres

You know your airframe, its strengths and its limitations. You know your weapons, and you have placed yourself in a position of advantage. But once the fight is on, you must know how to maintain your position.

Common manoeuvres include the Split-S, the Immelmann, Lead and Lag Turns, the Break Turn, High and Lo Yo-Yo, and Boom 'n Zoom techniques. All these techniques are well documented, so we'll stick to some general advice.

Common errors for the novice include overshooting the enemy and ham-fisting the stick. Others include staying in the fight too long (one on one eventually becomes two on one). Finally, as noted by Hartmann, most novices shoot far too early. Don't forget the old cliché: "Lose sight, lose the fight."

Avoiding the overshoot is the biggest challenge as you began to learn air combat techniques. If you have a speed and/or altitude advantage, and especially if you have the element of surprise, your tendency will be to dive on your enemy with full throttle, closing too fast to line up your shot and then shooting past him and giving him a chance for a shot. Learn the use of your throttle and flaps, and use a manoeuvre like the high Yo-Yo to manage your energy.

One technique that helps increase your kill ratio is the early turn. Simply put, even if you are up against a superior aircraft, you can out-turn your opponent if you begin your turn first. Timing is critical, but an early turn can also force your opponent into a high deflection shot.

Another useful technique is 'driving to the corner'. If you are detected during your approach behind a bandit, he will attempt
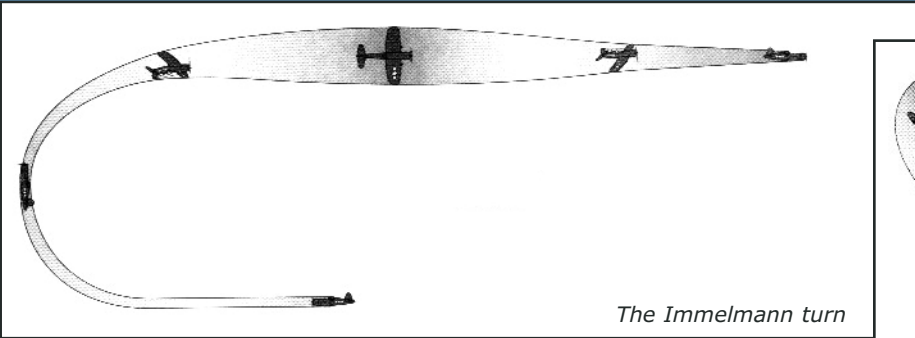
The Immelmann turn
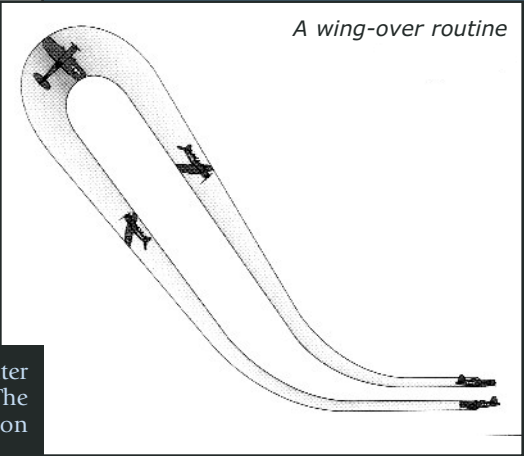
A wing-over routine

The following is from an interview with Ray Knott, P-51 pilot with the 55th Fighter Group, stationed at Northampstead 16th September 1943 to 16th April 1944. The interview was conducted by his nephew, Stan Knott and is quoted with permission from his website (http://homepages.go.com/~fsgpics/article.htm):

"Your height is an energy gauge; the higher you are the more energy you will have. Never give up your height unless you need to escape an attack.

Look for an incremental advantage. Don't try to out turn the enemy in the first pass just try to not give him a shot at you.

Look for longer track shots. Don't take 'pot shots', you'll use up your energy. Wait until you have a nice clear shot then let off a lethal burst. Wait until you can't see the wing tips in the sight.

Try to figure what your enemy's energy situation might be.

Use your tail (with rudders) to trick enemies into lead turning the wrong direction.

Fly to where the enemy is going to be not where he is. Track the nose in relation to the wing tips.

Don't get fooled by the tail. Match his wing aspect. If nose is tucked under the tail, don't follow his turn. He'll beat you with his current plane of turn.

Look for the lift vector. Watch for his plane and don't trust lift vector track, less than 45 degrees. Once you're past 90 degrees, you might as well forget that shot and begin setting up your next one.

The pivot point for any prop plane is at the planes centre of gravity, right at the cockpit. Always shoot for the pivot point, it's the last place to move during a turn.

Watch for your enemy's stall. If you see it climb up above him unless you have an excellent shot, but I wouldn't take a shot at a spinner - too hard to hit.

Follow your stall don't fight the stall or spin. That will put you in a worse position. Hide your spins by going with the stall. The enemy may think you're disengaging.

Understand the enemy's options. What would you do to get out of his situation?

If enemy is 'greedy' pulling high G's, use the vertical.

If you're the aggressor nose high. If you're the defender, nose low.

Get him to commit first.

Aggressiveness is good but don't over - shoot.

Fly to his corner to follow him. Wait for the shot to mature.

If you're dropping from the fight, don't let him gain lead. Fly to your wingman.

Don't 'ham fist.' Get out of the turn fight and regain energy.

The engines have to do the work, not the elevators. Be patient and wait it out. "

to either flee or turn into you. Novices often try to aim their aircraft at the bandit too early, using up energy or coming up with only high AOT and high deflection shots. Instead, start to turn just before the corner – just before the position where the enemy began his turn. You have a better chance of placing yourself on the tail and a better chance of a kill.

Finally, learn to use your combat flaps and learn to use the lift vector to your advantage. These techniques are actually related.

Disengaging

This is often the most dangerous stage of air combat. If you haven't killed your opponent and if he still has ammunition, it is likely that you will disengage for one of three reasons: you have taken damage, you are out of ammunition or you are outmatched.

All of these are good reasons to disengage and all will place you in great danger. So, how do you exit the fight and live to see another one?

If you have the faster aircraft, dive away from the fight.
If you have a wingman, call for help!
Fly towards other friendly aircraft.
Hide in the clouds.
Go as low as you dare and hope your opponent crashes.
Bail out.

If you get away, you can take them on another day!

Len Hjalmarson

Flight Sim Training

Professional instruction with Bill Stack

The charts used in these tutorials have been specially supplied and reproduced with kind permission of Jeppesen GmbH. These charts are NOT to be used for real-world navigation. They are for information ONLY. © 2000 Jeppesen GmbH.

JEPPESEN®

BEFORE YOU START

A few prudent practices that professionals normally apply can make your flights as realistic as possible.

OUR FLIGHTS AND AIRPORTS - This 130-mile, one-hour instrument flight from northern England to London presents a new experience: navigating with GPS (global positioning system). We will use all the instrument flying and navigating skills explained in our previous tutorials and rely on our GPS device instead of our panel instruments.

Heathrow Airport (EGLL) will be our destination in this pair of tutorials from Manchester to London. The straight-line distance is about 105 nautical miles, and the direction is south/southeast. Both the VFR and IFR flights are about 130 miles and will last about one hour.

Manchester (EGCC) is a busy airport that handles domestic and international flights. Located south of the city, EGCC has a single runway that heads northeast/southwest.

Heathrow is the world's busiest airport, depending which statistics you use. It handles more than 60 million passengers annually and covers over 200 international destinations. West of London, it has two east/west runways and one southwest/northeast runway. Light aircraft such as our Cessna 182 would not normally land at Heathrow, but we decided to take a liberty with this colossus to show what real pilots face when using it.

You can try the tutorial later in larger, more sophisticated aircraft if you wish. All estimated times are based on a Cessna 182RG. Somewhat longer or shorter durations might apply to other aircraft.

USE FLIGHT PLANS - We will use flight plans for both our VFR and IFR flights. Each tutorial explains what should be in each flight plan. In lieu of ATC, we will imagine that we have filed in accordance with regulations.

TRACK STATUS AND PROGRESS - Throughout your flights, check your instruments for the status of your aircraft, systems and positions. Monitor your engine temperature, oil pressure and fuel-flow gauges.

Also, check your position frequently and adjust your heading as necessary to stay on course. With GPS, tracking your position simply requires comparing position and track to the course and waypoints laid out on the GPS map. In the VFR flight, you can supplement the GPS with ground references. In the IFR flight, you can supplement GPS with radio navigation aids. Comparing the GPS information with ground-based observations and instruments will help you understand how to use all these navigating and positioning systems.

COMPENSATE FOR WIND - The winds we are using in these tutorials will slow your aircraft a bit and blow it off course slightly. Refer to our Issue 4 tutorial for a detailed explanation of flying in wind.

SIMULATE AIR TRAFFIC CONTROL - Both these tutorials into London will take us through airspace congested with aircraft of all sorts from smallest to largest and slowest to fastest. Real pilots flying in this airspace are under strict ATC guidance and must have clearances for just about every action. In lieu of ATC in your simulator, make yourself aware of the nature of this airspace and every pilot's relations with ATC while flying in it.

REFER TO OUR PRIOR TUTORIALS - For space considerations, we will not repeat common aspects in every tutorial. If you don't have our previous tutorials, copies are available from PC Pilot - visit www.pcpilot.net for details.

OUR AUTHORS - Bill Stack is an expert flight simmer and author of several popular flight-sim books. Nels Anderson, technical consultant, is a certified pilot, renowned flight simmer and president of www.flightsim.com.

FLIGHT SETUP

Prepare your simulator for your flights. Some preparations apply to both, and others apply to the VFR or IFR flight only.

SET UP YOUR WEATHER
For both flights, we'll simulate conditions that existed in August. Set your weather as follows.

Visibility:	greater than 7 miles
Wind:	11 knots from 240
Clouds:	few at 1,400 feet MSL; broken at 8,000 feet MSL
Conditions:	light rain
Temperature:	19 C
Pressure:	30.09 in (1019 mb)

The low clouds are all right for our VFR flight as long as we fly around them instead of through them. The 8,000 feet MSL clouds are conveniently above our flight path. Both cloud conditions are all right for our IFR flights, too, because IFR pilots can fly through the clouds rather than around them.

You are free to fly during daylight or night conditions. Night conditions are a bit more challenging, especially for visual flights in congested airspace such as over greater London. If you choose night flying, refer to Issue 6. You might try taking off during early dusk so you will leave Manchester in daylight and arrive at Heathrow in darkness.

PREPARE YOUR AIRCRAFT
Be sure to prepare your aircraft for flight before taking off by setting your radios and gauges and turning on your lights. The following conditions apply to the VFR and IFR flights.

First, be sure there's enough fuel on board. For these hour-long flights, 30 gallons total should be plenty. At these low elevations, your fuel mixture should be rich, and your propeller pitch should be low. If you have cowl flaps, open them fully whenever your engine is running on the ground to help cool the engine during low airflow operations. Keep them open during your takeoff and climbout. Be sure your wing flaps are not deflected and your carburettor heat is not on, because you will need neither. The pitot heat won't be needed unless the temperatures are below freezing and there's moisture in the air.

Tune Your Radios
Although you can rely largely on your GPS for VFR and IFR navigation, you still need your conventional radio navaids for airport operations and as a backup during the enroute portions. For the frequencies for each flight, consult our appropriate setup checklists. Set your Nav1 and Nav2 radios and your OBI for the first frequencies and radials you will use.

Set Your GPS
Engage your GPS by displaying it on your screen. Then check the displayed course to be sure it reflects your desired flight path. Remember that it won't accurately reflect the SIDs, STARs or IAPs, so don't worry about them. Set the map for 'north up', 'course up' or 'track up', whichever you like best.

PREPARATION CHECKLIST
Aircraft Settings

Engine:	running
Fuel supply:	adequate
Fuel mixture:	richest
Propeller pitch:	highest
Cowl flaps:	open fully
Wing flaps:	up completely
Carburetor heat:	off
Pitot heat:	as needed
Rudder:	straight
Ailerons:	neutral
Elevator trim:	neutral

Gauges

Altimeter:	local pressure
Amperes:	neutral
Vacuum:	green
Oil pressure:	green

Radios
Nav1: 113.55 (MCT) or 113.65 (HON)
Nav2 (if available): 113.55 (MCT)
OBI: 166/346
Com1: 118.62 (Tower)

GPS

Map view:	on
Orientation:	as desired
Zoom level:	as appropriate
Plotted course:	as filed
Displayed:	as needed

Lights

Beacon:	ON
Strobe:	ON
Position (navigation):	ON
Landing:	ON

Clock
Local time or your choice

VFR (Visual Flight Rules) Tutorial *Part 7*

Manchester To London Heathrow – visual flying with high-tech navigation

For this VFR trip from Manchester to Heathrow, we will use the GPS (global positioning system) to assist with our navigation. Because of this we will not need outside references for navigation. However, you will enjoy noting significant landmarks as we pass them. As usual, our flight path and durations are shown on our flight plan.

REVIEW YOUR CHARTS
The VFR charts show our course from Manchester to Heathrow, including the waypoints for getting us there. Familiarise yourself with your course and navigation aids before taking off, so you won't have to fumble around trying to figure them out enroute. Real cockpits have little room for studying charts.

PLAN YOUR FLIGHT
Based on the charts, we have laid out the course you will fly from Manchester to Heathrow. After taking off, you will intercept the 166/346 radial of Manchester VOR (MCT), which leads to Honiley VOR (HON). Upon reaching HON, you will follow the 138 radial to Bovingdon VOR (BNN), which is about 15 miles north of Heathrow. Then you will proceed to Heathrow's runway 23.

THE GLOBAL POSITIONING SYSTEM

GPS (global positioning system) is a radio positioning and navigating system. A small device uses signals from the numerous satellites that orbit the Earth to plot its position relative to the Earth's surface and display this information on a small screen. Relevant data from a database gives the pilot a complete picture of position, heading and tracking. The data includes airports and navigation aids as well as maps of terrain and political boundaries such as nations, states and provinces. The accuracy is within 10 to 20 metres, so it is suitable for most flight operations.

With GPS becoming the sole navigation system, eventually replacing the current system of expensive radio-navigation aids, aviation officials are developing more instrument procedures that depend on using GPS. This pair of tutorials not only enables you to enjoy another feature of your flight sim, but it also brings you to the forefront of aviation.

In PC based flight simulation, the positioning data come not from satellites but from the software itself. Nonetheless, the simulated GPS device accurately resembles real ones.

Although GPS is fully implemented, the decades-old system of ground-based radio-navigation aids, airways and intersections is still being used. Abandoning these systems is unlikely to happen for several years hence. Aviation authorities advise using radio navaids as a contingency in case GPS fails for any reason. Therefore, pilots wanting to use GPS still need to know how to use radio navaids. This is why we have waited until now to explain GPS, even though we know many of you have been anxious to learn about it. Anyone following our tutorials should now be familiar enough with navigation to use GPS.

Like other consumer products, GPS devices from various manufacturers differ in use but perform the same basic functions. Flight Simulator 2000's GPS device has four basic screens: a moving map, details of the filed route, waypoints selected by the pilot and lists of nearby airports in case of an emergency. Menus allow users to select which information to display on the moving map, such as airports, navigation aids and intersections.

When the Flight Simulator 2000 automated flight planner is used, your aircraft's course and track and distances between them are displayed on the GPS map. Using it will help you maintain course from waypoint to waypoint along this route. This course-tracking feature is a major advantage of using GPS, so its use is recommended although not required. We're going to assume your use of it during your first flight and you can forego it later, if you like.

The GPS map screen shows your course, track, position, and distance to the course as well as whether the course is left or right of your position. The map also lists your next fix, your bearing and distance to it, your ground speed and your heading. The concentric rings around the aircraft symbol show the distance between your aircraft and significant points such as airports, navaids and intersections. The closest ring to your aircraft is 5 miles, the second ring is 10 miles and the third ring is 20 miles. Depending on your zoom level, the map shows nearby airports and fixes. The closer the zoom, the fewer it shows, and vice versa.

Other GPS screens list data such as your latitude/longitude position, your programmed fixes, your ETE (estimated time enroute) and your ETA (estimated time of arrival) based on the panel clock.

Enter data on the 'Emergency' screen only if you need to abort your flight plan in an emergency. This feature will replace your programmed destination with an airport you selected for an emergency landing from a list of nearby airports.

The Flight Simulator 2000 flight planner also creates a navigation log that shows the estimated durations and fuel consumption for each leg and the total flight. This feature is handy for comparing your actual flight to your plan.

Independent from GPS, Flight Simulator 2000 provides a large moving map that provides all the details usually provided by GPS, plus a lot more. Some of its features are incompatible with real aviation, however, so we will ignore this feature.

Throughout the two current tutorials, we will refer to your GPS device as we navigate you from point to point. When using your GPS, you might want to follow your progress with your OBIs and ADFs, too, so you can see how GPS compares to them.

Before using your GPS, check the displayed course to be sure it reflects your desired flight path. Remember that it won't reflect your actual flight paths around the airports, such as departures, arrivals and approaches. Moreover, the Flight Simulator 2000 flight planner does not support prescribed instrument departure, arrival or approach procedures, so the flight path shown on the GPS will have to be ignored during those operations.

Flight Simulator 2000's Nav Log

Waypoints	Route	Alt (feet)	Hdg	Dist	GS (kts)	Fuel	Time
				Leg		18.6	20:15
EGCC				Rem	Est	Est	ETE
				131.9	Act	Act	ATE
BNN (113.75)	-D->	5498	152	116.2	148	10.4	0:46
				15.6			
EGLL	-D->	5498	169	15.6	148	1.4	0:06
				0.0			
Totals:				Distance: 131.9 nm		Fuel: 11.8 gal	Time: 0:52

Print   ? ✓ ✗

GPS Map Screen (North Up)

GPS Waypoint Screen

GPS Route Screen

GPS Map Screen (Track Up)

Our cruising altitude of 5,500 feet MSL is beneath the charted IFR airways while in accordance with requirements for VFR flights heading between 090 and 179.

ELECTRONIC FLIGHT PLANNER

If you use Flight Simulator 2000's electronic flight-plan feature, enter the following flight data:

Departure: Manchester airport runway 24R
Arrival: Heathrow airport runway 23
Waypoint: Honiley VOR
Waypoint: Bovingdon VOR
Altitude: 5,500 feet MSL

Check your GPS map to see whether our course is plotted as desired. If it isn't, correct the error in the flight planner before embarking on your flight. Although we're using the electronic flight planner, old-fashioned paper charts and flight plans are still useful for seeing our course and estimated times at a glance.

EMBARK ON YOUR FLIGHT

Note your take off time, then take off as normal and fly straight out. Climb steadily to 1,400 feet MSL, which is nearly 1,000 feet AGL (above ground level) at Manchester. If you opened your cowl flaps, adjust them as needed during your climb to keep the engine temperature in the green area (not too hot and not too cool).

Once you reach 1,400 feet MSL, make two course changes. (1) Change your climb rate to 500 feet per minute if it has been more than that. (2) Turn left 90 degrees at a steady 20-degree bank and head 120 degrees so you can intercept MCT's 166/346 radial at about a 45-degree angle. If your

aircraft struggles to maintain your desired climb rate during this climbing turn, reduce your bank angle to 10 percent.
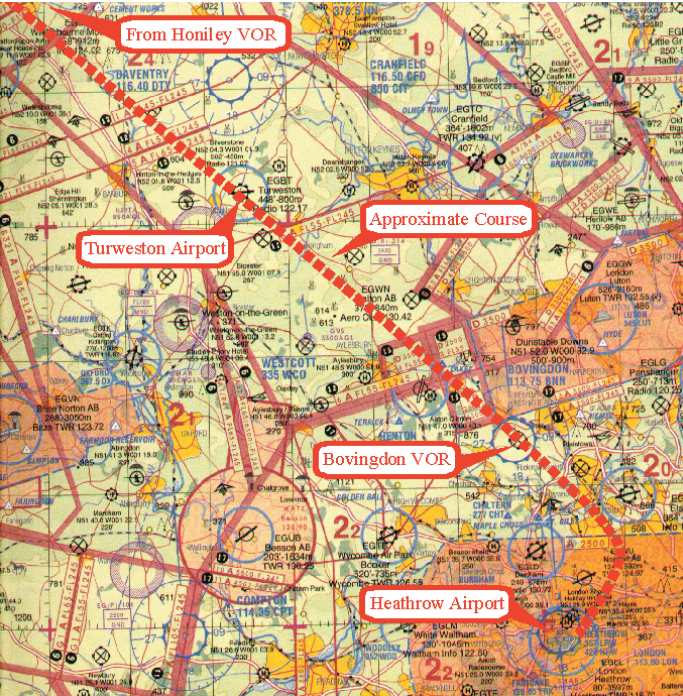
Your GPS map will show your aircraft approaching the course line from MCT to HON. Interception should happen two or three minutes after taking off, depending on your airspeed and turning arc. If you had preset your OBI needle on 166, it will sweep to the centre from the left as you intercept the radial.

When you intercept MCT's 166/346 radial, turn right and head 166 along the course line on your GPS map. Adjust your heading as needed to maintain your track along the course. As you follow this course, notice on your OBI that your needle is centred at 166/346. Compare the OBI reading to the course/track indication on the GPS map.

Pilots would normally notify Manchester tower that they are leaving the airport's airspace, then contact enroute ATC. Simulate this contact yourself in lieu of ATC features in your simulator.

Upon reaching our cruising altitude of 5,500 feet MSL, level off and maintain straight and level flight. You may use your elevator trim or autopilot to maintain cruising altitude and/or your heading. If you choose to have your autopilot hold your heading, be sure to allow for winds. Otherwise, your aircraft will drift off course while holding the selected heading.

Adjust your propeller and fuel mixture as appropriate for the altitude. The higher you fly, the higher the propeller pitch and the leaner the fuel mixture you will

Labels: Manchester Airport; Manchester VOR; Approximate Course; Birmingham Airport; Honiley VOR

need. Check your outside air temperature, and turn on your pitot heat if needed.

This 63-mile portion of our flight will last about 28 minutes. Your estimated distance, duration and arrival time to HON will be shown on the GPS screens. Until you get there, you won't have much to do other than count down the miles, calculate the remaining time and enjoy a little sightseeing. You might also use this opportunity to see what information your GPS provides, how it provides it and how that information compares to your OBI and DME.

If you drift off course, check your heading to see whether it has changed or if the wind is blowing you off course. Adjust your heading as necessary to stay on

Labels: From Honiley VOR; Approximate Course; Turweston Airport; Bovingdon VOR; Heathrow Airport

course or get back on course if you drift from it.

A few minutes after leaving Manchester, you will see an urban area ahead and to your right. That's Stoke-on-Trent. This half-way location between MCT and HON is the place to switch your VOR from MCT to HON (113.65). A few minutes later, you will enter the urban area north of Birmingham.

Soon thereafter, you will pass over Birmingham airport (EGBB) to the east. Pilots would normally notify Birmingham ATC that they are entering the airport's airspace, so simulate this contact. Those of you who have been following along with us each issue will remember our stopover at EGBB in Issue 3. In a couple of minutes, you will be at HON.

When you arrive at HON, turn left and head 138 toward BNN. As before, maintain your attitude, heading, course and interest throughout this leg. Compare your course tracking on the GPS map with the OBI indication.

This 54-mile leg of our flight will last about 22 minutes. Your estimated distance, duration and arrival time to BNN will be shown on the GPS screens. We'll pass Banbury, then Milton Keynes, then Aylesbury. About 11 minutes after HON, or half way to BNN, we'll pass right over Turweston airport. You'll see the airport straight ahead and displayed on your GPS map. At this half-way point, change your Nav1 radio to 113.75 to receive and track BNN. Between here and BNN, check with Heathrow ATIS at 123.9 for current weather at the airport.

By the time you reach BNN, you will be flying close to the outskirts of London and the urban areas below should soon become clear to you, day or night. Be especially careful to maintain your course and altitude in this congested airspace.

BEGIN APPROACHING HEATHROW AIRPORT

At BNN, we will enter Heathrow's radar-vectoring area. This means that from here to the airport, pilots are normally under rigid ATC guidance. In lieu of this guidance, we will follow a path that a pilot approaching runway 23 might expect from ATC.

As soon as you pass BNN, head 137, then notify Heathrow approach that you have entered its control area. From this point on, your path will not match that shown on the GPS map, so ignore it. If the airport is not displayed on your GPS map, zoom out until it is. You can zoom in as you approach the airport for a closer look, if you like.

Descend to 2,500 feet MSL and adjust your aircraft for the changing air density and new

flight phase: (1) fuel mixture rich, (2) propeller pitch high, (3) landing lights on, (4) carburettor heat on and (5) altimeter consistent with local weather report. Continue your 137 heading until you are 12 miles from BNN. Then, turn right and head 230 toward runway 23. Align your aircraft and proceed with your approach.

Why are we not using a standard airport traffic pattern, as we described in earlier tutorials? Heathrow is a busy commercial airport under tight air traffic control. Normally, ATC guides aircraft to the airport with radar assistance and the standard airport patterns are not used. Thus we must modify the procedures for these tutorials, because light aircraft do not normally use Heathrow.

LAND AT HEATHROW

Land on Heathrow's runway 23 normally. For this flight, the 240 winds will be nearly a direct headwind on landing, so refer to our third tutorial for how to land in winds. Be sure to exit the runway after landing, or your otherwise successful flight will be tarnished by a ground violation!

CONGRATULATIONS!

You have just navigated about 130 miles through busy airspace using the latest navigation technology for guidance. For more of a challenge, fly this route again with different winds and/or a more sophisticated aircraft. For more information about GPS navigation, read Bill Stack's Flight Sim Navigation at www.topskills.com/flightsim.htm.

IFR (Instrument Flight Rules) Tutorial *Part 7*

Instrument flying using high-tech support - Manchester to London with GPS

For this IFR trip from Manchester to Heathrow, we will use the GPS to assist with our navigation, but because our GPS doesn't provide complete navigation support, we will need to rely on conventional radio navigation aids for guidance around the airports.

Our IFR flight plan reflects our flight path, distances and durations from Manchester to Heathrow. Normally, pilots would make their flight plans in duplicate, submit a copy to ATC and use their original in the

cockpit. In lieu of ATC, we will make one flight plan, use it during our flight and file it after our flight in a folder or loose-leaf binder.

READ YOUR CHARTS

The charts show the instrument procedure for departing Manchester, the enroute airways for flying to London and the instrument procedures for approaching Heathrow.

For our southerly departure, we will use the SID named Conga One Romeo (CON 1R). It will

direct us south/southeast toward Conga intersection, which is about 15 miles south of Manchester. This intersection will be shown on the GPS map. From there, we will join the airway to London.

CON 1R calls for one climb gradient: 365 feet per nautical mile up to 5,000 feet MSL. The table on the SID chart shows that at climb airspeeds between 75 knots and 100 knots (which fits the general-aviation aircraft we will fly) a climb gradient of 365 feet per nautical mile is achieved by a vertical climb speed of no less than 456 feet per minute.

The routing and altitudes for CON 1R are shown on the chart and specified in the 'Routing' and 'Altitude' columns in the table at the bottom.

The entire SID from take off to Conga is about 15 miles and should last about seven or eight minutes.

From Conga, we will fly the A1 airway to HON. This leg is 51 nautical miles, so flying it should take about 23 minutes. The minimum enroute altitude for the A1 airway is 8,000 feet MSL. For southerly routes, IFR altitudes for headings between 180 and 269 are even numbers such as 6,000, 8,000 and 10,000 feet MSL, so we must maintain at least 8,000 feet MSL for the duration of this leg. Let's use 8,000 feet MSL, which is approximately the desired cruising altitude for most general-aviation

aircraft. If you fly this route in a larger, faster aircraft, you may choose a higher altitude.

From HON, we will fly a 54-mile leg to Bovingdon VOR (BNN), which is about 15 miles north of Heathrow.

On arrival we'll be landing at a huge commercial airport that light aircraft don't normally use, so we must disregard the STARs. Heathrow's STARs lead aircraft into the airport's airspace from far away at high altitude. They are inappropriate for our general-aviation flights, so we'll fly directly to BNN at minimum IFR altitude and join the IAP there.

The approach we use depends on which runway we choose. As flight-sim pilots taking liberties with Heathrow, we can choose whether to land on runway 27L or 27R. Each is as good as the other and both provide precision approach guidance. Using 27R is better, because it is closer and we will not need to cross inbound traffic to reach it.

The IAP chart for 27R calls for heading 137 then turning right to intercept the ILS. It also shows the decision height, key waypoints and the missed approach procedure, if needed. Be as familiar with this procedure as you can before entering it so you can use it smoothly.

PLAN YOUR FLIGHT

Based on these charts, we have laid out the course you will fly from Manchester to Heathrow. After taking off, you will fly the SID to Conga intersection, then to HON, then to BNN, then join the IAP for runway 27R.

Labels: Honiley VOR; Approximate Course; Bovingdon VOR; IFR Legs; Heathrow Airport
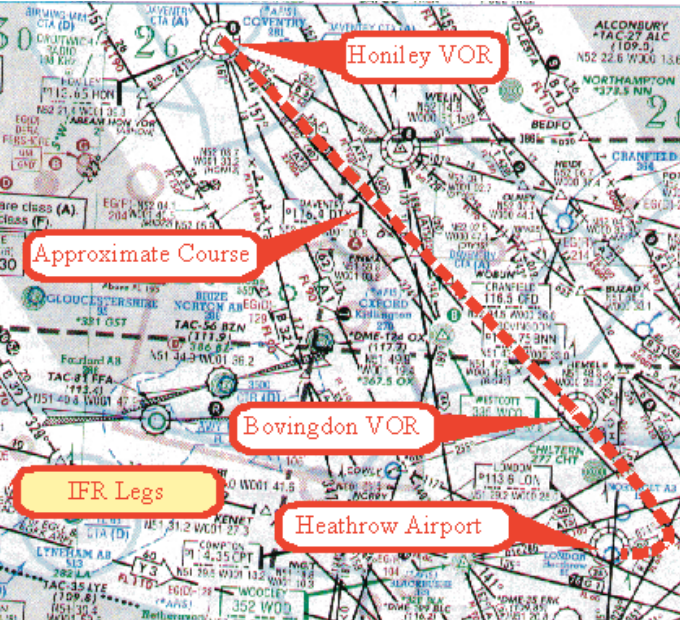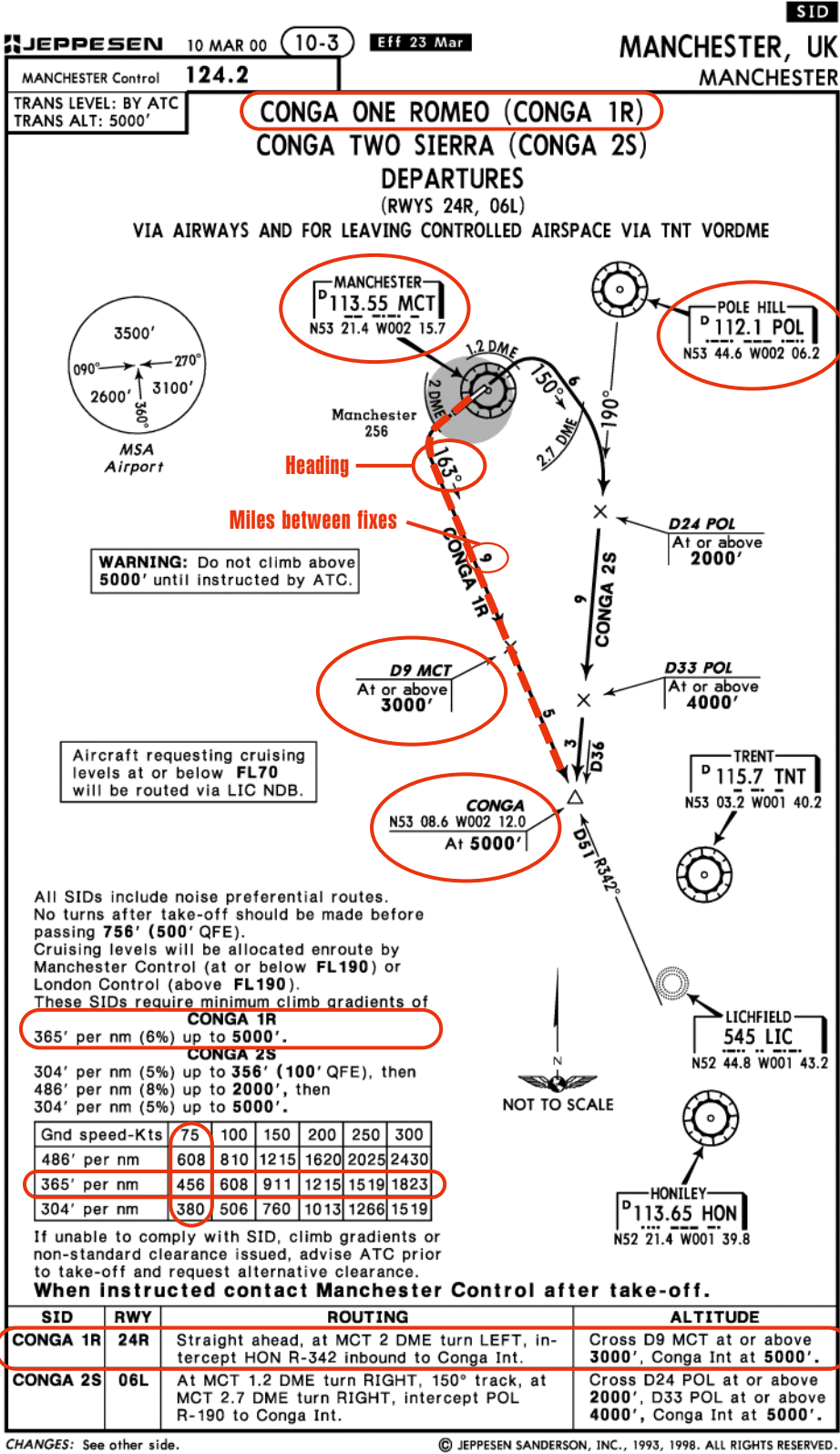
Manchester SID - Conga One Romeo

The ILS DME for Heathrow Runway 27R

ELECTRONIC FLIGHT PLANNER

If you use Flight Simulator 2000's electronic flight-plan feature, enter the following data:

Departure: Manchester airport runway 24R

Arrival: Heathrow airport runway 27R

Waypoint: Conga intersection

Waypoint: Honiley VOR

Waypoint: Bovingdon VOR

Altitude: 8,000 feet MSL

Because the flight planner does not support SIDs, STARs or IAPs, there are no options for entering any aspects of those procedures.

PAPER CHARTS, FLIGHT PLANS AND PREPARATION

Although we're using the electronic flight planner, old-fashioned paper charts and flight plans are still useful for seeing our course and estimated times at a glance. So keep your paper charts and flight plans handy for quick reference.

To make your aircraft ready for this flight, use our abbreviated checklist on page 48.

TAKE OFF NORMALLY

Take off as normal, including cockpit preparation and appropriate ATC clearances, as explained in our previous tutorials. If your cowl flap is open, adjust it as necessary to keep your engine temperature in the green range – not too hot or too cool.

DEPART MANCHESTER

Conga 1R calls for simple manoeuvers. From runway 24R, fly straight out at the specified climb rate until two miles from Manchester VOR (MCT) according to the DME (distance measuring equipment). Then, turn left and intercept radial 342/163 toward HON. To determine your course and position, you'll have to use MCT until this turn and HON after the turn. Continue flying this course until reaching Conga. Be at or above 3,000 feet MSL when at D9 MCT, which is nine miles from MCT according to the DME. Be at or above 5,000 feet MSL at Conga.

To determine our arrival at Conga with conventional radio navaids, we will need to switch our Nav1 radio to Pole Hill VOR (POL) at 112.1. When we arrive at the intersection of POL's 190/010 radial with HON's 166/342 radial, we will be at Conga.

Conga's position being clearly displayed on our GPS map makes this departure procedure much easier than using only the radio navaids, which requires switching back and forth among three VORs.

Remember that because the flight planner does not support airport procedures, the GPS will show our course without SID, STAR or IAP. Therefore, we can use GPS only for tracking our course during the enroute portion of our flight and we must ignore the course-tracking feature during these airport operations.

JOIN THE AIRWAY

With Conga being the last point on this SID, our reaching it is a transition from the SID to the airway. When you arrive there, check the current time and jot it on paper for reference. Also, switch back to HON from POL. From here, fly the A1 airway to HON. Climb to the 8,000 feet MSL altitude that we decided to use on this airway.

You may choose to maintain your altitude along this 51-mile leg with elevator trim or autopilot. If using elevator trim, be sure to check your altitude and pitch frequently and adjust as necessary to be sure you are maintaining the desired altitude. Use your GPS

map to follow your progress along the course to HON.

This 23-minute leg is a great opportunity to explore how the GPS can help you navigate. Examine the various screens and menu options to see what they tell you and how you can use that information. Compare your course and track displayed on the GPS with the readings on your OBI and DME to see how GPS compares to those familiar instruments.

If you drift off course, check your heading to see whether it has changed or if the wind is blowing you off course. Adjust your heading as necessary to stay on course or get back on course if you drift from it.

When you arrive at HON, exit the A1 airway and head 138 toward BNN. As before, maintain your attitude, heading, course and interest throughout this leg. This 54-mile, 23-minute leg is a good time for reviewing the IAP and preparing for this final portion of our flight.

Half way to BNN, we will fly right over Turweston airport, which will be shown on your GPS map. At this point, change your Nav1 radio to 113.75 to receive BNN so you can compare the OBI reading to the course and track displayed on the GPS map. Before getting to BNN, tune in Heathrow's ATIS on 123.9 and read or listen to the information. By the time you reach BNN, you will be in the busy airspace around London. Be especially careful here to maintain your course and altitude.

JOIN THE HEATHROW APPROACH

Upon reaching BNN, you will enter Heathrow's radar vector area and the instrument approach procedure for runway 27R. Pilots would normally notify enroute ATC that they are leaving the airway, then contact Heathrow approach. Simulate these procedures yourself.

Remember that your GPS track will no longer match the course plotted for you by the electronic flight planner, because this planner does not support airport procedures. Our only use for GPS now is for mapping position relative to the airport, the ILS and pertinent landmarks in the area.

Join the IAP at BNN by heading 137, and reducing altitude to 7,000 feet MSL as shown on the chart. If you were using your autopilot to maintain altitude, disengage it now and use your elevator trim for the remainder of the procedure. Thereafter, be vigilant about holding your courses and altitudes throughout this procedure, because this airspace is very busy and there are
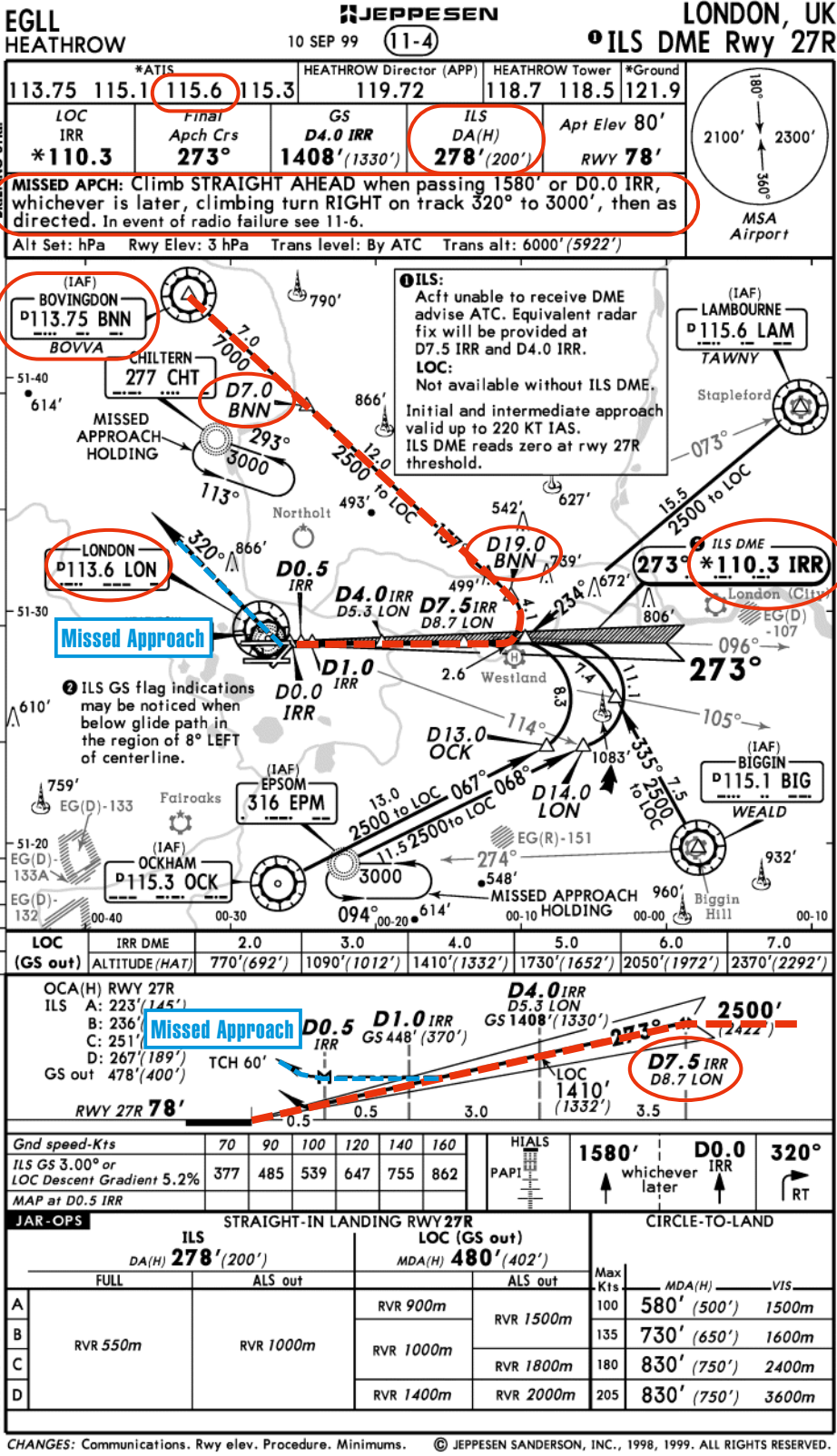
numerous obstacles in the Heathrow area.

When you reach D7.0 BNN, which is seven miles from BNN on this heading according to your DME, reduce your altitude to 2,500 feet MSL. Continue on this heading until you reach D19.0 BNN, which is 19 miles from BNN according to DME. Losing 4,500 feet of altitude in 12 miles

at 120 knots will require a descent rate of about 750 feet per minute.

Be sure to adjust the aircraft for the changing air density and new flight phase: (1) Fuel mixture rich, (2) propeller pitch high, (3) landing lights on, (4) carburettor heat on and (5) altimeter consistent with local weather report.

If you have two navigation radios, use Nav2 for tracking BNN and Nav1 for receiving the ILS for runway 27R. Its abbreviation is IRR, and the frequency is 110.3. If you have one navigation radio, you will need to switch your Nav1 from BNN to IRR as soon as you pass D19.0 BNN so you can receive the ILS signals.
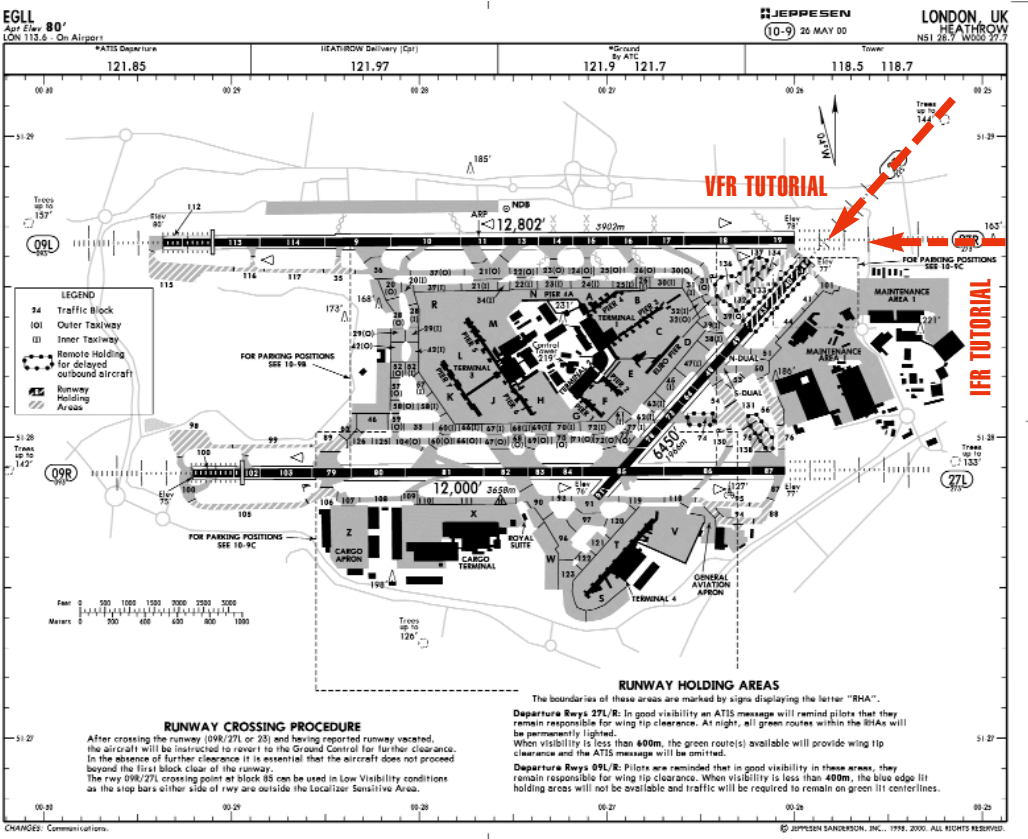
Heathrow airport diagram

This chart shows
the airways,
navigation
aids and fixes
we will use between
Manchester
and London.

LAND ON HEATHROW 27R

Land on Heathrow's runway 27R normally. Remember that in our 240 winds, we will be landing in a combined headwind/crosswind. Refer to our third tutorial for how to land in winds. Be sure to exit the runway after landing, or your otherwise successful flight will be tarnished by a ground violation!

MISSED APPROACH?

If your position on final approach is unfavourable for landing, a missed approach is required. Not only must you be properly aligned with the runway for a safe landing, the chart states that the runway must be visible from only 200 feet above the ground. If these two conditions are not met, you must execute a missed approach.

Practising the missed approach procedure specified on the IAP for this runway is simple. Fly straight ahead until reaching 1,580 feet MSL or D0.0 IRR, whichever is later (D0.0 IRR is right above the DME transmitter). At D0.0 IRR, turn right and head 320. If you have one navigation radio, tune Nav1 to LON (113.6). If you have two navigation radios, Nav2 should already be tuned to LON. Climb to 3,000 feet MSL. Then follow ATC guidance. In lieu of this ATC guidance, fly to the missed-approach holding pattern anchored on Chiltern NDB, as shown on the chart, and fly it at least once for the experience. Then return to BNN and fly the approach again from there.

At D19.0 BNN, turn right to a heading of 274. This 137-degree turn will take about 45 seconds. A 10-degree bank should be plenty in our light aircraft. Be careful to turn towards 27R and not 27L. If you have one navigation radio, switch Nav1 to IRR during this turn and intercept the localizer. If you have two navigation radios, leave Nav1 tuned to IRR and switch Nav2 to LON VOR (113.6). You will need it if you execute a missed approach. At your 2,500 feet MSL altitude, you should intercept the glide slope at D7.5 according to the ILS DME. From the point of glide-slope interception, follow the localizer and glide-slope needles as usual toward the runway.

CONGRATULATIONS

You have successfully flown enroute from one airport to another by relying mostly on the latest navigation technology. Well done, indeed!

Keep flying this tutorial to build your proficiency. Apply stronger winds and turbulence and advance to more sophisticated aircraft to make it more challenging if you like. For more information about instrument flying, read Bill Stack's Instrument Flying for Flight-Sim Pilots – available from www.topskills.com/flitsim.htm. ∎

Bill Stack

PC Pilot Tutorials are officially approved by TopSkills

Bill Stack is an expert flight simmer, the author of numerous training manuals for flight simulation computer programs and the owner of TopSkills in the USA. TopSkills publishes and distributes reference and self-learning books about flight simulation and other subjects.

The books that cover various flight sim subjects are:

Flight Sim Pilot's Information Manual 1999

Instrument Flying for Flight-Simulation Pilots

Flight Sim Navigation

Flight Sim Maneuvers

and others….

All these great books can be obtained by visiting the TopSkills web site at www.topskills.com

Nels Anderson, technical advisor for these tutorials, is a general aviation pilot and president of www.flightsim.com

---

Flying books

As autumn fades and winter draws on, it's time to huddle a bit closer to the fire and settle down with a good book. These are three of the finest historical volumes we have seen for a while and would be a great addition to the library of any aviation enthusiast.
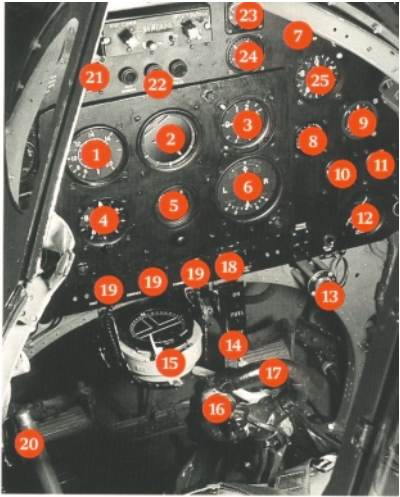
Spitfire: The Canadians Vols. 1 and 2

Spitfire: The Canadians is the result of nine years of research and over two hundred interviews with former Spitfire pilots and ground crew. The stories are told with candour and humour, related in the words of the men who fought for the free world.

Most of the photographs that appear in the two Spitfire volumes are copied from the veteran's own albums and so are unique. The images, like the stories themselves, capture the colour of the personalities no less than the drama of the times.

In the foreword A.V.M. J.E. "Johnnie" Johnson relates his personal experience with the Canadian pilots of the Spitfire.

"In the spring of 1944 I became wing commander of a new Canadian Spitfire wing (144), and on June 15, 1944, we were the first Spitfire outfit to move into Normandy, at Saint-Croix-sur-Mer. From the beachhead our fighter-bombers stunned and paralyzed the German armies, which found their own blitzkrieg tactics now turned against them..."

Volume 1 opens with three accounts from the Battle of Britain, one from Jan Zurakowski, the Polish ace who went on to become a famous Avro test pilot. Zurakowski's story relates his technique for exiting a fight alive, with a snap roll culminating in a vertical stabilised spin. Quickly opening and closing the throttle (producing volumes of black smoke), the enemy would abandon the fight and notch up a kill! Zurakowski would then recover at a safe altitude and look for a better opportunity. It's fascinating stuff and a great improvement over some of the motley collections of words and pictures that we've seen bundled together in recent years.

Volume 1 closes with scale schematics of the Spitfire VB, IX, XIV and XVI. Volume 2 is identical in tone to Volume 1, but with fewer accounts. The higher price is due to a later edition. These two volumes certainly do justice to the memory of the Spitfire crews from north of the 49th Parallel. ∎

Len Hjalmarson

REVIEW SCORE:		
Publisher:	Boston Mills Press	Price: £20.00 (approx.) Vol. 1 £24.00 (approx.) Vol. 2
Website:	www.bostonmillspress.com	
Book Author:	Robert Bracken	
Pros: Very well produced		Cons: Possibly a bit too specific for the casual reader.

Cockpit - An Illustrated History of World War II Aircraft Interiors

The spitfire cockpit in all it's glory

Cockpit is a volume that no devotee of military aviation history should be without. In the introduction Air Vice Marshall Ron Dick writes, "Cockpit… it defines the place where the fighting cocks of the aviation world waged their vicious battles…" and this sets the tone quite well.

Reading on takes us inside the revered fighters and bombers of the Second World War, including rare shots of Japanese and German interiors. Carefully organised, the volume is divided into five major sections: United Kingdom, USA, Japan, USSR, and Germany.

Each section opens with 5x8cm thumbnails of the cockpits to be examined in the pages that follow and the sections all adhere to a standard pattern.

The first one is dedicated to the fighters and bombers of the RAF and opens with the Gloster Gladiator. Of the four pages, the first is a textual history and the second page is a black and white photo of the Gladiator in flight. The following two pages comprise 'The Pilot's Perspective' and a full-page colour photo of the cockpit. On the left panel is the text and a schematic diagram with coloured labels and explanations below, whilst on the right panel is the cockpit in all its glory. This pattern is repeated for eight more British aircraft, and then similarly for the other nations.

A total of 35 cockpits are examined. Sadly, there is only a single example for the USSR (the YAK-3). The volume is beautifully put together and would grace any collection or coffee table, as well as being essential reading for anyone contemplating a panel design or building a cockpit. ∎

Len Hjalmarson

REVIEW SCORE:		
Publisher:	Boston Mills Press	Price: £23.00 (approx)
Website:	www.bostonmillspress.com	
		Book Author: Donald Nijboer
Pros: A fascinating look at cockpits and essential for flight simmers who want to see the real thing.		Cons: Won't be popular with slipshod panel developers or Russians.

ITTV Civil Aviation Flightdeck Videos

One of the best ways to learn about flying is to watch experts at work. For commercial airline flying, this usually involves talking your way onto the flight deck, although there are at least three major problems with this approach. Firstly, it's unlikely that you will be able to see the full flight, secondly the commentary you get will be given off the cuff and is unlikely to cover all aspects of the flight and lastly, you are unlikely to be flying often enough to get all the information you would like. If you watch a good video on the subject, however, it could well remove most of these drawbacks.

The videos reviewed here are produced by ITVV (Intelligent Television and Video) and are of excellent quality. With many hobby videos the content is all too often let down by the quality of filming, but we found these to be as good as it gets.

The range of videos on offer covers Boeing's 737 to 777, and from Airbus and Whisper Jet to Concorde. There's even an A320 simulator covered in the series. The videos are not instructions on how to fly the planes but do give an impressive overview of the equipment and procedures used on the individual aircraft for the flights. You will not see how the pilots fly a procedure or establish themselves on the ILS, but you will see them reviewing the important elements of the approach and hear ATC vectoring them around the sky towards their destination airport.

BAe 146-200

The BAe 146-200 Whisper Jet video, part of the ITVV Platinum series, is filmed on a flight from Luton to Rome with Captain Nicholas Stein and First Officer Kevin Long of Debonair. Nick, who does most of the description and explanation, is a Training Captain with about 6000 flying hours. He is therefore highly qualified to describe the relevant aspects of the aircraft and does so in a very clear way. The two hour video starts during the pilot's walk round inspection before the flight and swiftly moves on to the pre-flight checks and ground crew coordination during pushback and engine start. You are then treated to the take off, departure and climb phase of the flight, with all the checks and radio calls along the way. Once established in the cruise, the pilots take time out to tell you about the plane and how it all works. The same is done on the return flight, and by

Airbus A330-200

Your hosts for the fly by wire, side stick controlled Airbus A330-200, are Airtours pilots, Captain Julian Bond and First Officer Mark Haley (on his first normal operating flight on this particular plane) flying from a damp Manchester to a sunny Orlando Sanford. The flight uses ETOPS (extended range twin operating procedures) flying a route over Ireland and then down the east coast of the US. The format is fairly similar to the 146 with an introduction and external walkround of the plane before entering the cockpit for the pre-flight briefing and checks.

the time they are back in the UK you will have been told about all the major systems and instrumentation on the plane. Their presentation includes a comprehensive description of the TMS (thrust management system) and warning panels.

Their flight continues with an approach and landing at Ciampino followed by shutdown and a rapid turnaround for the return flight. The format of the return flight is similar to the outbound flight, however different aspects of the flight and plane are described. You will see how busy the pilots actually are at the beginning and ends of the flight when the workload is high.

Our only criticisms of this video would be the amount of time spent showing the pilots' faces, when most aviation enthusiasts would have preferred longer views of the panel and controls. However the pilots have clearly planned what they are going to show and discuss during the flight and they do it very well.

The checklist and the SID are shown on the screen while they are reviewed so you can follow what they are talking about. There is quite a long taxi out to the holding point, which could have been shortened, and it's about 28 minutes into the tape before the plane takes off. The voices of the pilots and ATC are not as clear as on the 146 during the climb but don't worry about it because as soon as the planes is in the cruise you are treated to a tour of just about everything on the instrument panels.

This includes a clear and very full review of each of the six electronic displays and the different ways they can show information. You will hear about everything from the managed and selected modes of flying the plane to the pressurisation system and monitoring the tyre pressures. The flight computer and all its different pages are described as they are stepped through one at a time, including the navigation display, nearest airports and equitime points. If you are keen to learn about modern aviation technology and have a smattering of knowledge, your guided tour through the various glass cockpit panel displays will be fascinating.

Quite a lot of acronyms and jargon are used, some of which are explained and some are not. The acronyms are so familiar to commercial pilots that they often either don't realise that they are using them, or don't suspect that you may not know what things like ATSU and APU are, which of course is where the PC Pilot glossary is handy!

This video takes a while to get to the most interesting bits, but that's not a concern because it lasts over two hours and the information given in flight is very thorough.

Concorde

Concorde must be the most interesting commercial jet ever built and your guides on this video are British Airways Captain David Rowland and Senior Flight Engineer Roger Bricknell.

The video is a little different to the others as a considerable amount of time is spent on the ground showing you round the plane and describing pretty much everything that is visible. With the Flight Engineer doing the external tour of the plane, the explanations you are given are about as comprehensive as you could get. There is oodles of detail and the tour covers everything from how the control surfaces work and what a radio altimeter looks like, right down to peeking at an afterburner and describing which wheel brakes are used and when. You are given a practical demonstration of the drooping nose and visor, together with an explanation of when and why the different positions are used.

Before taking off, the Captain gives a reasonably thorough look around the various panels in the cockpit on the ground. Including the various engine instruments such as the primary nozzle (bottom) gauge, the three lights on top of each engine stack and electronic throttle controls. You are told more about these during the flights. There is a description of the checklist philosophy and what the various different checklists are used for.

The video then moves on to flights from London Heathrow to New York JFK and back. The Captain hand flies the departure whilst describing everything that it going on. You will see the sound barrier being broken, how the afterburners are switched off above Mach 1.7 and the effect of outside

air temperature. If you have ever become frustrated trying to reach Mach 2 in Concorde on your simulator, you will see how long it takes to reach 23 miles per minute in the real thing and how height and speed are continually traded against each other in the cruise.

The outbound flight finishes with deceleration, decent and radar vectors onto the JFK 31R ILS, which interestingly includes the use of idle reverse to increase the rate of decent. You will also see that the captain has an excellent view of the runway throughout the approach and landing, unlike the non-existent view with some simulators.

The return flight itself starts with the take off from JFK runway 31L and the noise abatement procedure round Jamaica Bay. It finishes with a hold before an ILS approach through cloud and 10 knots wind shear to Heathrow runway 27L. The presentation format of the return flight is pretty much the same, but this time the Flight Engineer tells you all about his engineering panel and tasks during the flight. The most significant of these involves the complex fuel system. There is a multitude of fuel tanks and the fuel is moved around to control the fore and aft centre of gravity balance. But that's not the only reason it is moved. It is also pumped around to reduce wing bending, keep things cool, for safety and balancing Concorde in roll to reduce drag. It is even moved forwards to facilitate unloading at the end of the flight.

He also tells you about the engines including how they are started and de-bowing the shafts, as well as an explanation of the operation and use of engine intake ramps. Again, there is much more information such as technical trend monitoring, defect logging and the hydraulic system.

There are two tapes in the Concorde pack giving five hours of solid information about the plane and it was definitely our favourite of the videos reviewed here.

Finals

Anyone who is genuinely interested in aviation is likely to find these videos fascinating. They are the kind that you will want to watch several times to fully understand. There is a considerable amount of factual information embedded in the videos, which makes them informative rather than purely entertainment. However this is most definitely seen as a positive point, as detail is usually what a flight simulation enthusiast wants. If you are interested in the commercial aircraft aspects of flight simulation, this is a superb way to see how it should be done and these videos would also be a boon to the would-be cockpit builder

Stephen Heyworth

REVIEW SCORE:			
Publisher:	Intelligent Television & Video	**Price:**	Various, from £21.95
Website:	www.itvv.co.uk	**Release Date:**	Out Now
Developer:		N/A	

Pros: Filled with accurate information about planes, not just pretty pictures. Well presented by pilots and flight engineers. High quality video production and longer than some others.

Cons: Won't teach you how to fly the planes. Don't expect your Grandma to enjoy it.

Key Features

- Compatible with Windows 98/2000, iMac, or Mac with USB port*
- New ergonomic designed yoke movement without centre detent
- Five axes of control including, pitch, roll, throttle, propeller, and mixture
- 20 button functions including, 2-way gear switch, 2-way flaps switch, 8-way hat switch, two 2-way rocker switches, and four push buttons
- Precision trim control
- 2 metre cable
- USB interface
- Compatible with Pro Pedals USB

Macs will require InputSprocket 1.7x & OS8.6+

CH Flight Sim Yoke USB

Software compatibility list:

- Terminal Reality - Fly! 2K
- Terminal Reality - Fly!
- Jeppesen - FlitePro Version 6.2.0
- Hasbro\Wayward Design - B17 II
- Microsoft - Flight Simulator Professional
- Cat III Systems - Virtual Wings Pro (release 1.6 or later)

In Issue 3 of PC Pilot we reviewed a number of yokes and pedals, one of which was the popular CH Flight Sim Yoke PC. While we gave it the 'Best Value' award, we were less enthusiastic about its mushy return action and occasional sticking, making hand flown ILS approaches quite sweat inducing! In the meantime, CH have been busy on the next generation of controller for pilots, the Flight Sim Yoke USB. Complete with throttle, prop pitch, fuel mixture levers, a USB (Universal Serial Bus) interface and essentially the same mold as the gameport version, it appeared that CH was out to improve the product and take advantage of new features now present within the latest simulations.

After some circuit board problems during the initial production run, CH has provided us with the latest model for review. Did CH do their homework? Read on for the answers as we give the spanking new Flight Sim Yoke USB a test run.

Two big features on this yoke make the news headlines. Firstly, the USB interface, which not only claims more bandwidth over PS2 and gameport connections, but also permits devices to be plugged in while your computer is still running. Secondly, CH have added two control levers, allowing prop pitch and fuel mixture to be adjusted more realistically than tapping keys or clicking mice.

Installation, and Setup

Once you part with your cash you become the proud owner of the plastic yoke, two mounting clamps and a CD. However, nothing important is left out and the CD is loaded with goodies for both the Mac and the PC, including DirectX 7.0a., Netscape 4.5, and an X-Plane demo. The manual, if one were to call it such, provides the most basic information to the user, but enough for even a beginner to make a successful installation. Mounting the yoke was identical to the earlier version, requiring us to install spacers between the clamps and our desk.

Nothing is easier than turning on your PC, plugging in a peripheral and having Windows inform you instantly it has found new hardware. USB devices are that quick and easy in most cases and the CH Yoke was no exception. Only needing the Windows 98 CD to complete the installation, in no time our system was equipped with the latest and perhaps greatest yoke CH has released to date, all without rebooting or calibrating. This we like!

The next step was to load the simulation and configure the array of buttons, switches, and levers to our liking. Using Flight Simulator 2000, opening Options\Controls\Assignments and then selecting 'joystick axes' was the key to enabling

USB: worth the wait?

USB is certainly not the latest technology in the world, however the number of devices available is anything but overwhelming. However slow it may be, it appears that USB is going to become the way to connect mice, keyboards, game controllers, et al, to our PCs in the near future. So is it worth waiting for USB versions of products?

We'd have to answer a resounding yes, given the ease of installation, control improvements, and the expansion potential that USB hubs offer.

The only requirements are:

1) A motherboard with USB ports and BIOS that enable them.

2) An operating system that supports USB (Windows 95 (version .950B), Windows 98/98 SE, Windows 2000, Windows ME)

Built in Help

The Windows 98 CD supplies a USB diagnostic tool called 'USB Viewer' that can poll a device attached to the USB port and check for responses.

To install the USB Resource Kit:

1) Insert Windows 98 CD into your CD-ROM Drive.

2) Click Start, then Run.

3) Type X:\tools\reskit\setup (where X is the drive letter of your CD-ROM drive), press enter.

4) Follow directions for the installation.

the prop and fuel mixture features on axes four and five. Thus, in a matter of twenty minutes we had gone from a taped up shipping carton to the cockpit of a C182 with a shiny new yoke, eager for its first flight.

In the Air

There are obvious improvements here over the old gameport model. Throttle inputs, for whatever reason, are as precise as we have seen, even more accurate then the AFCS II throttle, that partners Precision Flight Controls expensive, but high-quality yoke.

Yes, another set of complicated plugs. The USB ports are the slotted ones in the middle!

Flying the default aircraft proved easier and more controllable than ever before. The addition of the prop pitch and fuel mixture levers is most welcome, certainly justifying the increase in cost. At long last one can fly a constant speed prop aircraft and use levers to adjust it, up-scaling the reality factor a small but significant amount.

The X-Y axes were very smooth, with no noticeable sticking or binding as in the previous version. Switches and buttons are abundant, all within easy reach and simply configured to your personal preference within the program.

Some minor 'tweaking' is the only remaining task for the CH and the yoke should be out by the time you read this. When we spoke to Jon Michaels, head of CH at the London ECTS trade show in September, he explained that delays to the launch had been caused by chip problems, but these were now resolved and the finished product was ready.

Our only other observation is that we still prefer the heavier feel in a yoke that more spring tension would provide, but this perhaps is getting somewhat finicky. ■

By Greg Gott

Final Words and Grading

The more flight time we had, the more impressed we became with the CH Flight Sim Yoke USB. It appears to be an excellent choice both for those changing from a joystick and for those unhappy with their current yoke. Coupled with the USB pedals, this gem at a little over £100 might just break some sales records. This seems like a winner!

As with any product that we sink our hard-earned money into, most of us expect, nay deserve, a certain amount of customer service and care from the manufacturer. It has become an unfortunate truth that many companies fail to exhibit anything resembling such a thing. For this reason, PC Pilot always include in our grading a reflection of the level of service that we receive, averaged with any known grievances that you, the reader might have with them.

GRADES

Installation and Calibration:

Performance:

Features:

Customer Care:

Overall Value:

ACP Compact

"Golf –Bravo-Zulu Contact approach on 125.85… good day"

It's an undeniable fact that the majority of flight simulator users approach the subject with a dedication and passion that outsiders find difficult to understand. They're unaware that we find flight in any form a magical experience, even if it's conducted in front of a PC. The pleasure of cruising along into a sunset, the difficulty of a crosswind landing, or the struggle to maintain a holding pattern while approaching some distant airfield, is just as real to the pilot whatever the vehicle.

However a computer, or more particularly the interface between the computer user and the machine itself, doesn't really afford the sort of realism we're all searching for and this brings us to the subject of products that are designed to bring the experience that much closer to reality.

The first one we looked at was the ACP Compact from Aerosoft. This is a relatively small box of tricks that sits alongside your computer, offering a more realistic method of interacting with your simulated aircraft. In other words, it's a box of switches that performs a number of functions normally reserved for your keyboard or mouse. It's designed to be fastened to the side of your monitor, using two strips of rather sticky Velcro (which are supplied). This method is far from ideal, because of the obvious mess it's going to make on your monitor, however you need to have the unit alongside the screen in order to use it and despite this gripe it seems to work well enough.

The ACP is designed to replace the conventional controls for both Flight Simulator 98/2000 and CFS, by automatically emulating the control functions of keystrokes (29 in all). The idea is that the unit is used in exactly the same way that the cockpit controls would be, so you don't really have to use the keyboard at all. The unit connects between the keyboard and the computer, using the cables supplied. Both standard and US cables are provided and surprisingly the ACP works straight away, no configurations, no software - that's it. You may need to install the US keyboard driver from your Windows 98 disk, but the review machine seemed to work fine without it, although we understand certain functions are said to work better with the US keyboard driver.

The advantage with the ACP is that it will emulate practically every cockpit control function, from setting the ADF and Transponder frequencies, to operating the Nav and landing lights. It has dedicated switches for flaps and undercarriage and a global switch that changes the panel so that all the buttons and knobs can perform a second function. Other options include carburettor heating, prop-settings, adjusting mixture and one of the buttons brings up the radio stack so that you can see to change frequencies. Additionally, if you're using the unit with Flight Simulator 2000, then you can also access an extended version of the in built software, by pressing one of the buttons on the panel while switching it off and back on again. This gives you direct setting of the heading bug, altimeter and directional gyros and a quicker response to the commands sent by the ACP panel.

After using the unit for a few weeks you begin to wonder how you managed without it. The ACP unit performs very well and does everything it's supposed to, but the general consensus was that the materials it's made from could be a lot better. It's not a cheap piece of equipment, so we would expect the rotating switches and push buttons to be better quality than they are. To be fair to the ACP panel, Aerosoft have packed a lot of functionality into a small unit, it's just a shame those LEDs on the front aren't real!

Joe Lavery

A close up of the available controls

This is what the ACP panel looks like hanging on the monitor

GoFlight GF-45 Display

Small and perfectly formed

The GF-45 boxes are well made with very clear displays

Our second offering in the 'bolt on box' department is from Go-Flight (an American company) and it's called the GF-45. Unlike the ACP unit, this is a more substantial affair made of matt black steel. It has rotating control knobs on the front that are larger and have a more positive feel than the ACP ones. They are situated each side of the two alphanumeric LED displays that mirror the flight simulator settings you define. The GF-45 units provide a single function only, so unsurprisingly they are designed to stack one above the other. This could ultimately give you a full COM/NAV radio stack… that's if you can afford it. Such a set-up would cost over £300, assuming you bought all five units. Of course, if you do decide on a full stack you will also have to add the cost of a USB hub to your budget, as most PCs can only accommodate 2 USB devices.

The GF-45 units connect to your PC via a standard USB interface, consequently they are immediately identified when you plug them in. You simply feed in the supplied 3.5" disk when Windows asks for a driver, which also contains the control software and a small test program to make sure the units are functioning correctly. You have to type some data into the two on-screen boxes and press the update button, which immediately transfers the data you typed onto the GF-45s' LED displays. To assign the units a specific function you run the configuration pro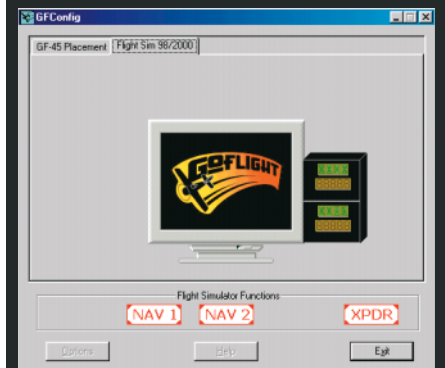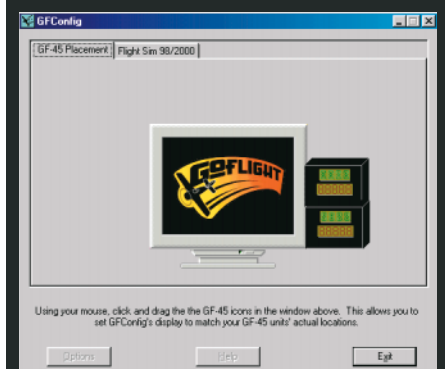gram, which allows you to set the position of each unit in the stack and also the radio device it will control. This whole process is completed in a couple of minutes and the next time you launch Flight Simulator the displays automatically come to life, showing both the radio component you designated and the current frequency set. If you're using a control panel that has twin radios, i.e. one primary and one standby, then the GF-45 units will display the active radio settings.

The units can be defined to control any of the COM, NAV, ADF or Transponder functions and if you want to buy perhaps a single unit to start with, then you could reassign them for different types of aircraft or flight conditions. The obvious assignment would be COM1 and NAV1, which means you'd have to set the Transponder and NAV2 manually. This is not much of a constraint but after using them for a few weeks, you soon start to crave for just one more. The fact that you don't need to have the radio stack open on screen is a bonus, because you can really concentrate on the flying.

During the course of our usage the units behaved beautifully and although they only perform a single function, they are without doubt well worth the extra money. We would suggest a two unit set-up as a bare minimum, which is what we used for the review, this would also keep the cost down as you wouldn't need an additional USB hub.

Joe Lavery

To assign a function you simply drag the icon over the appropriate box and the test dialogue comes up

Don't Let Downloads Get You Down

We've had a number of readers asking for less Flight Simulator 98 and 2000 downloads and more for other simulators. Although we're keen, it's been difficult to oblige this request and not due to any Seattle-based favouritism on our part! We always choose our files by monitoring those uploaded to the major websites. A quick visit to these sites will show that practically 99% of the files uploaded are Flight Simulator related, either for 98, 2000 or Combat Flight Simulator. Since the performance of Flight Simulator 2000 became more acceptable, its files seem to have dominated the upload directories. It seems that if we want to see more add-ons for other sims, the designers will have to get busy. In the meantime, let us know about the latest downloads you've tried, especially if they're a bit unusual and not on any of the regular sites – mail us the details to: downloads@pcpilot.net and we'll take a look.

Here's a few gems we found on our regular trawl round the web:

X-Plane

Finnair A320

Not much for X-Plane this month (other than a completely new release of the software amounting to over 50 megabytes) but we found a new A320 from Mohammed Gazzawi & Sergio Santagada that looks rather good. The zip file also contains a detailed operational handbook for the Airbus range.
*By: Mohammed Gazzawi &
Sergio Santagada
Download from: www.avsim.com
Filename: x-pa320finnair.zip*
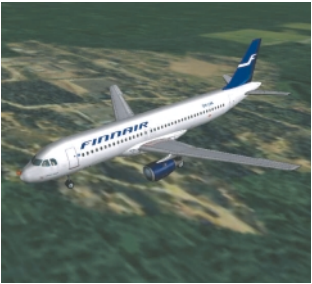
Flight Simulator 2000 Aircraft

British Airways B747-436

If you need a decent 747 for John Schumacher's panel, then have a look at the British Airways Boeing 747-436 registration G-BNLC 'Ireland'. Repainted by Apichart Owcharoenporn From a Sandro Bernardini original design, which like all his recent aircraft, display a real round body shape. We're told it's compatible with FS98 or 2000.
*By: Apichart Owcharoenporn
Download from: www.flightsim.com
Filename: apcbanlc.zip*

Air France Boeing 777-200

This aircraft and panel set typifies the quality of freeware products we've been speaking about over the past few issues. It depicts a B777-200 Air France aircraft with superb high definition textures and full accurate interior views. The panel is photo-realistic with a full set of gauges, although the author intimates that more accurate instrumentation is available on the Internet.
*By: Yannick Lavigne, air file by Steve Small
Download from: www.simviation.com
Filename: b777af.zip*

737-401 in classic US Air colours

Sandro Bernardini is one of the more notable designers who was responsible for the original of this aircraft, which is painted to match the paint scheme US Air had in the mid 90's. It features a 32-sided fuselage, working lights, working flaps that move out as well as down, spoilers, rudder, ailerons, fans, and gear.
*By: Original model by Sandro Bernardini, Repaint by Nick Dobda
Download from: www.flightsim.com
Filename: usair737.zip*

De Havilland Mosquito fighter bomber

Here we have an excellent WWII aircraft, the famous Mosquito fighter-bomber. The file includes both aircraft plus panel and features new high quality FS2000 engine sounds, with individual start-up/shut-down sequence that includes a typical backfire. The panel is designed with a certain amount of artistic licence, including both conventional instruments and a mini autopilot, the default FS2000 GPS and radio stack.
*By: Aircraft designed by Shigeru Tanaka, panel and sound-set by Jorgen Unschuld
Download from: www.flightsim.com
Filename: jumosq.zip*

1942 Stearman Biplane

The Cannibal Queen, is a modified 1942 Stearman biplane which author Stephen Coonts flew around the US during the summer of 1991. This incidentally was the same aircraft that was originally used for training the Tuskegee Airmen. The model features fully animated virtual cockpit, virtual instruments, sound files and maps to recreate this epic VFR aviation adventure.
*By: Bill Lyons
Download from: www.flightsim.com
Filename: cqueen.zip*

De Havilland Chipmunk

This aircraft is based on the famous DeHavilland Chipmunk that was used by the RAF University Air Squadrons for pilot training. It includes fully animated flaps, rudder, ailerons and prop and has a rudder-controlled steerable tailwheel. The file does not include a panel or sound files but the author recommends Pete Pitman's panel (chippnlu.zip), and the sound files mag1.zip and a38flap.zip.
*By: Graham P. Oxtoby
Download from: www.flightsim.com
Filename: rafchipn.zip*

Albatros DV

David Eckert has designed a nicely detailed Albatros DV, the famous WWI German bi-plane as flown by Hptm. Richard Flashar, sporting the mailed gauntlet motif and armed with two 7.92 mm Spandau machine guns mounted over the engine.
*By: David Eckert
Download from:
www.flightsim.com
Filename: albatros.zip*

Scenery Areas

Houston George Bush Intercontinental Airport

This scenery includes 27 square miles of photo-realistic ground textures, terminal buildings, airbridges and extensive night lighting. The author also mentions that it incorporates the latest improvements to the airport.
*By: James Shaddox
Download from: www.fsfreeware.com
Filename: iah2000.zip*

Alicante' Airport 'El Altet' v.1

If you've taken a holiday in Spain, the chances are you'll arrive at Alicante airport. This package by Miguel A. Pérez provides the scenery around the Airport of Alicante (Spain) incorporating both static and dynamic scenery.
*By: Miguel A. Pérez
Download from: www.flightsim.com
Filename: lealv1.zip*

Orlando International Airport

Another holiday destination for many Brits, in this case across the Atlantic into the busiest airport in the region. Christopher Gilbert has produced a highly detailed and accurate representation of Orlando International Airport, in Florida, USA.
*By: Christopher Gilbert
Download from: www.fsfreeware.com
Filename: mcofs2k.zip*
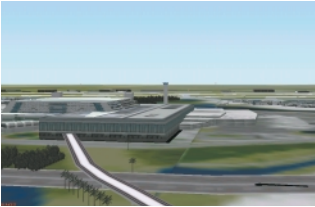
Hahn Airport (EDFH)

This is a very detailed and accurate airport in the west of Germany with the newest textured buildings and taxiways. The author has included, Summer and Winter textures, full night lighting textures with apron illumination and lighted signs. A separate Static Scenery file is available see (ahnstat.zip) Also SID, STAR and ILS charts for Final Approach 5.03.
*By: Manfred Spatz
Download from: www.flightsim.com
Filename: hahn2000.zip*

Utilities for Flight Simulator 98/2000

ATC-Controlled Adventure Flying

Release 1.6 of this utility, allows flights from A to B, round robin trips, unplanned flights and/or circuits (with low approach and touch-and-go options) - all with easy-to-use, spoken, keyboard-controlled ATC. It now runs with FS2000. Major new features include access to 22,000+ airfields from FS2000 are accessible (from both FS2000 and FS98 versions), higher speech volume, better front-end and user-supplied callsigns.
*By: Bill Hickman
Download from: www.flightsim.com
Filename: atcplus6.zip*

Static aircraft package FS2000

The author of this package, Harald Heidinger, has managed to enhance over 140 airports, (mainly in Europe, but also a few African, Far Eastern and some Caribbean airports). Adding airport taxiways, runway holding short signs, trees, taxiway centrelines some night lighting and of course lots of static aircraft.
*By: Harald Heidinger
Download from: www.avsim.com
Filename: statfs2k.zip*

Panels for Flight Simulator 2000

B747-400 Real CRT Deluxe Panel

This latest panel from John Schumacher features internal views and sounds, overhead panel, pushback, fuel calculator, fully working MFDs, Altitude Callouts, Seatbelt/No Smoking signs, and the FS2000 GPS. It has an optional configuration so you can include Alain Capt's GPS98-ver3 or a GPS of your choice and should be used with the SE-B747-400 Version 3 dynamics Air file, which is included.
*By: John J Schumacher
Download from: www.flightsim.com
Filename: b747dx1b.zip*

Flight Simulator 98 Aircraft

TA-4K Skyhawk

A Douglas TA-4k Skyhawk Va-126 Miramar NAS 'Top Gun' fighter squadron in aggresor colours. This carrier and land based attack bomber was first introduced in 1954. Original by Deane Baunton, textures by Gary D. Jones, FS98 modification, moving parts, flight dynamics by Lewis Magruder.
*By: Lewis Magruder
Download from:
www.flightsim.com
Filename: TA4kagr3.zip*

Oman Airbus 310-300

The authors of this aircraft have been less than forthcoming with info, so there's not much we can tell you. It's an FS98/FS2000 Oman Air Airbus 310-300. Original model by Jens Dohrn and Hans Peter. Repainted by Antonio Cabaca
*By: Jens Dohrn and Hans Peter
Download from:
www.flightsim.com
Filename: oman_310.zip*
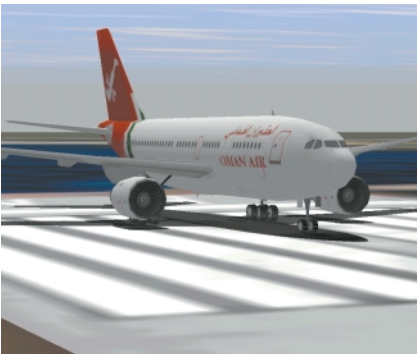
Winslow PD Highway Patrol, NJ Sikorsky S76B

Ian Standfast is well known for his many helicopter models and this fully animated rendition is typical of the quality. It depicts the NJ Sikorsky S76B, a very sleek, fast aircraft with superb lines and performance. Designed by Sikorsky for off-shore operators, it is widely used as a corporate executive transporter.
*By: Ian Standfast
Download from: www.fsfreeware.com
Filename: wpd_nj.zip*

Product Listings

A comprehensive round up showing some of our favourites from the many great products we've reviewed at PC Pilot. Where products are listed as requiring 'FS2000' this means the products are designed and adapted to run with Flight Simulator 2000 without any problems or bugs. As always, if in doubt check with the supplier or publisher before purchase to clarify any concerns.

CIVIL SIMS

Elite 6.0
Undoubtedly the best IFR procedural trainer there is. So it should be, the frightening price will put off all but the truly serious - the full kit can cost £695.

Initiative Computing £249.95   www.flyelite.com
Featured: Issue 4

Flight Simulator 2000
Despite much publicised criticism over poor frame rates and misleading PC requirements, this still seems to be the benchmark sim. An awful lot of sim for the money, but invest in a decent PC before buying.

Microsoft £49.99/£69.99   www.microsoft.com
Featured: Issue 2

X-Plane
Not for beginners or casual flyers, but definitely the 'thinking man's flight sim' - it's even compatible with a Mac, you can fly on Mars (among other places) and we loved the flight model. It also gets regular updates so Internet access is a must.

Laminar Research £75.00 (approx)   www.x-plane.com
inc. postage   Featured: Issue 6

Precision Simulator 744
A no compromise and no-frills approach to flying a Jumbo Jet. No pretty scenery or advanced terrain but probably as close as you'll ever get to the real thing without a trip to a full motion airline simulator

Aerowinx £159.99   http://aerowinx.com
Featured: Issue 6

Airline Simulator 2
Perhaps the best airline flight modelling around with accurate procedures (it's been designed by real airline pilots over many years). Unfortunately not for the faint of heart - old DOS interface and daunting controls a real put-off. Expensive too.

Just Flight £99.99   www.justflight.com
Featured: Issue 1

Airport Inc.
Take a rest from flying and show BAA how they should really run Heathrow. Fun, yet ultimately limited airport management game.

Take 2 £29.99   www.take2games.com
Featured: Issue 4

FlitePro
Offers a wide range of training features for the IFR pilot, yet reasonably affordable. Low frame rate for instruments detracts from its overall appeal.

Jeppesen £99.99   www.flitepro.com
Featured: Issue 4

Fly!
Overshadowed by Microsoft's mighty sim, Fly! has gathered a loyal following. Thought to be better than its rival and some excellent add-ons (and patches) enhance the appeal from when we originally rated it. Available at less than £10 in some stores so a true bargain!

Take 2 £39.99   www.iflytri.com
Featured: Issue 1

COMBAT

Enemy Engaged: Comanche vs. Hokum
Strikes the balance between gameplay and realism perfectly. Ideal for both rocket junkies or rotorcraft rookies alike. Only downside is no single mission mode and it's not as pretty as Gunship.

Empire £29.99   www.enemyengaged.com
Featured: Issue 5

Tuskegee Fighters
Beautifully designed aircraft and excellent scenery. The great missions add the final touch of genius. One for any CFS fan's must-buy list!

Abacus £29.99   www.abacuspub.com
Requirements: CFS   Featured: Issue 5

Flanker 2.0
Excellent, with great detail. This is one of the few combat packages that is worth calling a simulation. Online fan base will prolong longevity and interest.

Mindscape £34.99   www.ssionline.com
Featured: Issue 2

Janes F/A 18
Technically complex with masses of detail and lots of options. Mission builder is nice. Downside is that it is technically complex and you need a high-spec PC.

Electronic Arts £39.99   www.janes.ea.com
Featured: Issue 5

Janes USAF
Massive potential with formidable collection of aircraft simulated. Pretty graphics and pretty well done, though lacks details purists might seek.

Electronic Arts £39.99   www.janes.ea.com
Featured: Issue 3

Pacific Combat Pilot
Great aircraft with nice details, picturesque scenery and challenging missions. Blocky aircraft textures and strange German voices on the radio are its only drawbacks.

Just Flight £24.99   www.justflight.com
Requirements: CFS   Featured: Issue 3

F/A 18 Super Hornet
Unsurpassed carrier operations and silky smooth flight model appeal. Unfortunately only forty missions and the basic scenery detract.

Titus £34.99   www.superhornet.com
Featured: Issue 3

Gunship
Jaw dropping graphics and a neat gunner's position mode do not make up for the flawed gameplay and restrictive campaigns. Annoying bugs and features also put us off.

Microprose £34.99   www.gunship.com
Featured: Issue 5

Wings Over China
Interesting expansion for CFS with great Himalayan scenery. Good value, but some bugs can cause problems.

Abacus £24.99   www.abacuspub.com
Requirements: CFS   Featured: Issue 3

SCENERY AND AIRCRAFT

FS Traffic
Perhaps the best £20 you can spend enhancing Flight Simulator - it really does bring airports to life. Now in boxed and download flavours.

Just Flight £19.99   www.justflight.com
Requirements: FS98/2000   Featured: Issue 2

Luftwaffe Collection
Oozes authenticity and packed with an eclectic, yet perfectly detailed, collection of aircraft. Some CFS niggles (such as no Quick Combat set-up for the aircraft) only downside.

Just Flight £24.99   www.justflight.com
Requirements: FS98/2000 or CFS   Featured: Issue 1

Airport 2000 Volume 2
Incredibly detailed renditions of major airports with decent aircraft and adventures. Sadly a frame-rate hog in both FS98 and 2000 and adventures are complex.

Just Flight £29.99   www.justflight.com
Requirements: FS98/2000   Featured: Issue 4

FS Clouds
Fantastic effects with a minimal frame-rate hit and apart from a few graphic glitches it is a worthwhile improvement on Microsoft's own fluffy stuff.

Just Flight £24.99   www.justflight.com
Requirements: FS2000   Featured: Issue 6

German Airports 3
Wonderful enhancement for those interested in flying to the Fatherland. Like all beautiful things though, can drain system resources alarmingly.

Aerosoft £24.99   www.aerosoft.com
Requirements: FS98/2000   Featured: Issue 4

Grand Canyon
Breathtaking graphics from the developers of Airport 2000, with lots of new aircraft and adventures. Fun to explore, but ultimately limited area and poor frame rates.

Just Flight £24.99   www.justflight.com
Requirements: FS98/2000 or CFS   Featured: Issue 1

Mad Dog
Currently only for FS98, this is a hell of a package with aircraft and both beginner and professional panels of the MD-80 series of aircraft. Old style plane visuals and hefty price-tag

Lago £34.99   www.lagoonline.com
Requirements: FS98   Featured: Issue 1

Private Wings
A quality collection that all virtual pilots interested in light aviation should consider. Only downside is some aircraft do not feature transparent canopies.

Data Becker £19.99   www.databecker.com
Requirements: FS98/2000   Featured: Issue 5

Royal Air Force 2000
Eclectic, yet balanced, mix of aircraft with excellent panels and bonus of missions for CFS users. A few clumsy details on some of the aircraft are the only downers.

Just Flight £24.99   www.justflight.com
Requirements: FS98/2000 or CFS   Featured: Issue 4

737 for Fly!
A meticulous re-creation of the 737-500 for Fly! Superb detailing is only let down by blurry external textures.

Wilco £18.95   www.wilcopub.com
Requirements: Fly! & Fly!2K   Featured: Issue 6

HARDWARE

AFCS II Yoke
Heavy metal control, hand crafted and definitely the Aston Martin of controllers. Eye-watering price to match though.

AETI £400.00   www.simpilot.com
Featured: Issue 3

AMD Athlon 550 MHz Processor
If you are thinking of upgrading your processor, then the Athlon is the one we'd choose for the best flight sim set-up.

AMD approx £100.00   www.amd.com
Featured: Issue 5

Cirrus Pedals
Unsurpassed quality, these certainly deliver the goods. But at a price - do you really want to spend £250?

AETI £250.00   www.simpilot.com
Featured: Issue 3

Voodoo 5 5500
The latest offering from 3dfx, complete with FSAA, that now works in FS2000 as well. Better frame rates and smoother lines, but only those with long pockets need apply.

3dfx £249.00   www.3dfx.com
Featured: Issue 6

G400 Dual-Head
One of our favourite cards. 32Mb with nice twin monitor support. Fast, smooth and great value.

Matrox £150.00   www.matrox.com
Featured: Issue 4

OTHER PROGRAMS

SimCharts
Genuine Jeppesen airport charts (to all intents and purposes) at a bargain price. But they're on the CD and you need a decent printer. Treat yourself to the expensive pack and get printed en-route charts too.

Jeppesen £19.99/£29.99   www.jeppesenpcpilot.com
Featured: Issue 2

Aircraft Animator
Easy to use and delivers excellent results quickly. Only if you are a keen fiddler should you really splash out as most aircraft come ready-animated now.

Abacus £34.95   www.abacuspub.com
Requirements: FS98/2000 or CFS   Featured: Issue 2

Final Approach
Good value package that not only solves the mystery of IFR approaches, but also provides fistfuls of airport plates too. Not for the casual flyer though.

Just Flight £24.99   www.justflight.com
Featured: Issue 5

FS Design Studio Pro
A great package for designing scenery and aircraft. While relatively easy to use it can be tricky to place scenery accurately when you've finished being creative.

Abacus £39.99/£59.99   www.abacuspub.com
Requirements: FS2000   Featured: Issue 5

THE *ONLY* HUB FOR VIRTUAL AIRLINES

The featured VA in this issue wants to be the Web's Favourite Airline

British Airways Virtual

British Airways Virtual was founded by Stephen Ellis and went operational in April 2000, making it one of the youngest virtual airlines. To date they have had in excess of 21,000 hits to their site.

Pilot application requests exceed 40 per week, although not all applications are accepted. Their current pilot number is over 270 and expected to increase accordingly. More encouraging for BAV is the fact that a lot of the pilot base comes from other Virtual Airlines.

To bring all the pilots together, they have phased out 'operational hubs' and developed a new Crew Centre – offering facilities from downloads through to divisional operations. Everything a pilot could need is now under one roof.

British Airways Virtual is a corporation (in the virtual sense), consisting of several companies and divisions - which are developed and maintained by its directors. There is a Flight Academy that offers expert tuition to cadets/novice pilots by real experts, from theory, through flight basics, instrument and navigation, to solo flight. The passenger division is responsible for operating scheduled flights - regional/domestic and intercontinental through to worldwide on every contemporary aircraft in service.

There is also Go Virtual, the low cost scheduled airline to major European cities and Charter, aimed at the package holiday market. World Cargo has a vast and intricate network of routes and carrying cargo. Both World Cargo and Go divisions were recently been awarded additional contracts and routes.

The airline provides online flying sessions to pilots once a week using the Multiplayer function in Flight Simulator 2000 plans for SATCO fly-ins underway.

We asked the MD of BA Virtual, Stephen Ellis, if they had received any complaints from the real BA or any writ happy owners of 'exclusive' copyright. He advised that they had contacted BA back in April who had visited the site and as no BA logos are used it is unlikely to cause any upset. The whole issue of legal problems for virtual airlines is an interesting one and we would be pleased to hear any stories you have on this subject. ■

CONTACT DETAILS

Stephen Ellis – Managing Director
steveellis@totalise.co.uk
Website: www.bavirtual.co.uk

AIRLINES AROUND THE GLOBE

WESTWIND VA
This VA boasts some pretty challenging schedules, with over 3,000 pilots in its ranks. If you're up for it they've got room for more pilots.
WEB: http://www.flywestwind.com

JERSEY GROUP OF AIRLINES
A VA group that includes Jersey Euro Link, Jersey Cargo Link, Jersey Sun and is described as "based more on fun and freedom than on regulations".
WEB: http://members.tripod.co.uk/jeurolink

BAHAMASAIR VA
Offers world-wide destinations in addition to extensive services in south eastern United States, Bahamas and surrounding Islands.
WEB: http://cybermoo.net/bahamasair

KTEAM FLYING GROUP
Not strictly a VA, but a flying team that go to fly-ins and tournaments with their aerobatics group. Well worth a visit if you can keep your lunch where it belongs when you're pulling 6G.
WEB: http://www.kteam.homestead.com/kteam.html

EASTERN VIRTUAL AIRLINES
A Virtual Airline that's been up and running since August last year and that now boasts over 300 pilots in their ranks. Eastern have real 757 and 767 pilots available to answer questions.
WEB: http://www.evair.com/index.htm

BRITISH AIRWAYS VIRTUAL
British Airways Virtual started life in April with the aim to make flying with a virtual airline both a rewarding and enjoyable experience.
WEB: http://www.bavirtual.co.uk

TEXAS AIR CARGO
Texas Air Cargo operates out of the new Austin/ Bergstrom International Airport at Austin, Texas.
WEB: http://www.geocities.com/texas_air_cargo/

VIRTUAL BRITISH CALEDONIAN AIRWAYS
VBCA is a virtual airline that is targeted towards the UK and European flight simmer.
WEB: http://avsim.com/hangar/air/vbca/index.html

POLAR AIR VA POLAR AIRWAYS
Hub based at Amsterdam Schiphol Airport (EHAM) and offices in Almere the Netherlands.
WEB: http://www.polarairways.com/

VIRTUAL DELTA AIRLINES
This site is primarily for the aviation enthusiast interested in airline operations especially Delta airlines.
WEB: http://virtualdelta.cjb.net/

AIRKENT UK
AirKent is a VA from London. Currently operating the Airbus A320 family and BAe 146s from its main hub, Gatwick South Terminal.
WEB: http://www.airkentuk.co.uk/

VIRTUAL AIR COMMAND
Models itself on the real world US Air Force Air Mobility Command. Here you can fly all the big USAF heavies.
WEB: http://www.geocities.com/CapeCanaveral/Campus/6174/

VIRGIN SUN
Based at Birmingham International Airport, they operate from there as well as from London-Gatwick. They operate on flights to and from sunspots around the globe.
WEB: http://members.aol.com/Afre63456/vvs/

SUN CHARTER INTERNATIONAL
This is a new airline operating from the merger between BAC and SLJ, within the UK to European resorts and across the Atlantic.
WEB: http://sun_leisure.homestead.com/index.html

MANCHESTER AIRWAYS VA
Manchester Airways is one of the UK's newest generation of Virtual Airlines. Its extensive UK network operates out of Manchester Ringway.
WEB: http://www.wayne11.freeserve.co.uk/man/man.htm

60th HELICOPTER SUPPORT UNIT
A military style outfit that flies choppers in combat roles.
WEB: http://www.geocities.com/60thvaw/60thhsu/index.html

AIR JET UK
This airline claims to offer you a gateway to Virtual Airline flying.
WEB: http://www.flightsimnetwork.com/airjet

EASYJET
Based at London Luton airport in the UK and has over 15 destinations to fly to.
WEB: http://www.geocities.com/easyjet_va

EXCEL AIR
Serving Milwaukee, Daytona, San Diego, Denver, Dallas/ Ft. Worth, Los Angeles, Atlanta, Boston, Washington DC (DCA), Minneapolis St. Paul, and Phoenix.
WEB: http://ourworld.cs.com/FlyExcelAir

VIRTUAL 2000
Currently they fly to more than 90 destinations in Europe. UK-based.
WEB: http://va2000.homepage.com/

UK FLY
A new VA set-up to run throughout Europe and across the world.
WEB: http://www.avsim.com/

SOUTH EASTERN AIRLINES
Opened on 14 March 1999 and is based out of Hartsfield International Airport in Atlanta, Georgia.
WEB: http://free.prohosting.com/~se-air/

ICELAND AIR
They fly to most of the major airports on the US East Coast, Canada, and Europe using real world routes, time tables and of course the correct fleet of aircraft.
WEB: http://icelandair.tripod.com/

ALASKA VIRTUAL AIRLINES
Based on the real world airline, Alaska Virtual Airlines and Horizon Virtual Airlines have one of the most realistic flight schedules found on the Internet utilising comprehensive flight schedules.
WEB: http://alaska_va.tripod.com/

AIR LINGUS
This airline is based on the real Air Lingus airline. A must for Irish VA participants.
WEB: http://aer-avensis.hypermart.net/main.htm

KNIGHT AIR
This VA has three hubs in the UK and an extensive worldwide route network. They come highly recommended by their members.
WEB: www.knightair.org

BRITANNIA VIRTUAL AIRLINES
This VA is based on the real Britannia Airways, with hubs at Birmingham, Luton, Gatwick and Manchester. They also fly from another 14 UK airports and are about to move into Irish, German and Scandanavian areas just like the real Britannia.
WEB: http://BritanniaVA.worldzone.net

HAWAIIAN AIRLINES VA
A slightly different VA as it's for PCs and Macs but ONLY using PS1 or X-Plane. With a maximum of 16 pilots worldwide Hawaiian is also pretty exclusive. Book him, Danno!
WEB: http://www.gorji.com/hawaii.html

EUROPEAN WORLD AIRWAYS
European World Airways is a new VA with hubs based at Heathrow and JFK the Airline serves Europe, the Middle East and America, with their very own training facility.
WEB: www.europeanwa.cjb.net

SABENA VIRTUAL AIRLINES
Described as the 'official Sabena VA', working together with the real Sabena'. They have 30 pilots at the moment and have already won an award from Compuflight.
WEB: http://go.to/sabenava

AFRICAN EXPRESS (AFEX)
This is a VA operating a realistic and comprehensive network of schedules both within and out of Africa but based in South Africa. They're always looking for pilots so why not give them a look?
WEB: http://www.afex.co.za

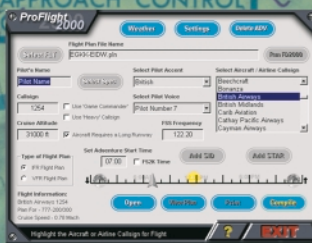**WINGS INTERNATIONAL ALLIANCE**
African Express, among others, are members of this group which is a collection of airlines from around the globe that allow pilots to fly just about anywhere whilst keeping things realistic.
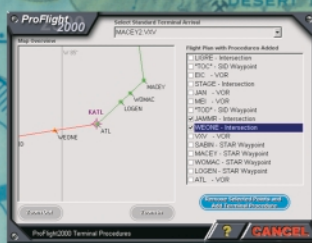WEB: http://members.xoom.com/wingsint

If you have a virtual airline that is not listed here, then please feel free to send in a short description to mail@pcpilot.net where we will endeavour to include it in a future issue.
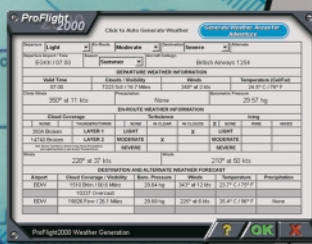
CRIMSON SKIES

Out October 13th

Microsoft

www.crimsonskies.co.uk